
APPENDIX C

SUBSURFACE GAMMA READINGS

APPENDIX C
SUBSURFACE GAMMA READINGS
Snake Pit Site
Fort Bliss, Texas

Location	Action Levels*	SP-BG-01-1	SP-BG-01-2	AOC-02-01-01	AOC-2-01-02	AOC-2-01-03	AOC-4-09-01	AOC-4-09-02	AOC-4-08-01	AOC-4-08-02	AOC-4-05-01	AOC-4-07-01	AOC-4-03-01
Depth (ft)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)	Reading (cp2m)
Fill Material/ Disturbed Soils	NF	NF	NF	NF	NF	NF	1891	1755	1990	NF	1735	1754	NF
	NF	NF	NF	NF	NF	NF	2367	2511	2434	NF	2268	2141	NF
	NF	NF	NF	NF	NF	NF	2582	2620	2810	NF	2446	2547	NF
	NF	NF	NF	NF	NF	NF	2602	2724	2688	NF	2515	2656	NF
	NF	NF	NF	NF	NF	NF	2545	2750	2765	NF	2579	2490	NF
	NF	NF	NF	NF	NF	NF	2225	2659	2300	NF	2769	2663	1651
	NF	NF	NF	NF	NF	NF	2061	2167	1613	NF	2657	2689	2036
	NF	NF	NF	NF	NF	NF	1801	1989	1504	NF	2522	2653	2415
	NF	NF	NF	1706	NF	NF	1851	1913	1678	NF	1951	2844	2387
	NF	NF	NF	2109	1783	1795	2195	2109	1891	NF	1657	2425	2188
0	1587	1569	1551	2100	2151	2431	2446	2489	2236	1708	2070	2369	2314
1	1840	1814	1788	1657	2144	2224	2606	2631	2555	1745	2404	2452	2254
2	2655	2441	2227	1435	1562	1857	2726	2701	2656	1589	2561	2567	2268
3	3474	2459	1444	1444	1462	1545	2685	2642	2854	1433	2440	2606	2337
4	2915	2030	1145	1724	1570	1700	2838	2799	2699	1521	2625	2729	2402
5	2235	2090	1945	2074	1647	1756	2924	3264	2761	1968	2573	2702	2254
6	2486	2360	2423	2633	1877	2127	3397	3645	2877	2267	2404	2913	2169
7	2872	2216	2544	2821	2522	2529	3240	3306	2915	2621	2709	2880	2513
8	2535	2463	2499	3005	2559	2764	2888	3157	2960	2744	2611	3054	2814
9	3200	2598	2899	3253	2766	3073	3037	3372	3021	2724	2577	2948	3052
10	3111	2881	2651	3174	2940	3124	3074	3373	2989	2877	2598	2934	3136
11	3215	3017	2819	3259	3087	3083	2984	3412	3076	2877	2700	3111	2994
12	3372	3107	2842	3356	3025	3181	2811	3363	3114	2935	2673	3079	2799
13	3760	3120	2480	3454	2999	2968	2944	3356	3145	3311	2944	3351	2755
14	3002	2885	2768	3589	3049	2897	2986	3156	3433	3130	2794	3325	2827
15	2956	2929	2902	3651	3147	2968	3225	3273	3435	3205	2953	3402	2765
16	3151	2820	2489	3499	3119	2926	3417	3790	3262	3063	2811	3049	2825
17	3123	2857	2591	3227	2740	2648	3531	3933	4019	2999	2906	3187	2878
18	3341	2607	2974	2794	2638	2530	3303	3926	4068	3190	3016	3473	3395
19	3791	2573	3182	2341	2537	2514	3442	3558	3587	3395	2832	3173	3378
20	3331	2827	3079	2360	2407	2398	3699	3444	3106	2995	2949	3410	3130

Notes:

* Action Levels are based on the average of the two background borings plus 3 standard deviations(3 sigma)

Values highlighted yellow exceed the Action Level and are below twice the background reading.

NF- No Fill encountered

APPENDIX D

PA DATA FILES

(Provided on Enclosed CD)



MILITARY MUNITIONS RESPONSE PROGRAM

FINAL SITE INSPECTION REPORT

Fort Bliss
El Paso, Texas

March 2011



U.S. Army
Corps of Engineers





March 31, 2011

(b) (6)

U.S. Army Corps of Engineers
CESPK-PM-H
1325 J Street
Sacramento, CA 95814-2922

**RE: General Services Administration Schedule Number GS-10F-03435, Delivery
Order No. W91238-08-F-0011; Transmittal of Final Site Inspection (SI) Report
for Fort Bliss, El Paso, Texas**

Dear (b) (6)

Enclosed is one copy of the Final Site Inspection (SI) Report for Fort Bliss, El Paso, Texas. We have submitted additional copies of the Final SI Report, as noted below. All comments that were received on the Draft SI Report have been addressed. However, any remaining questions on the responses have been requested to be sent to you no later than April 7, 2011 (1 week).

If you have any questions or comments concerning this submittal, please call me at (303) 763-8881.

Sincerely,

(b) (6)

(b) (6)

Project Manager

Enclosures

(b) (6)



TRANSMITTAL SHEET

US Army Corps
of Engineers
Sacramento District

DATE: 31 March 2011

TO: Fort Bliss, El Paso, Texas Final
(see attached)

PROJECT: Site Inspection under the Military Munitions Response Program
Final Site Inspection Report
CONTRACT NO: GS-10F-03435, Delivery Order No. W91238-08-F-0011
INSTALLATION: Fort Bliss, El Paso, Texas

THE ENCLOSED DOCUMENTS ARE BEING TRANSMITTED TO YOU FOR:

☐ COORDINATION ☐ REVIEW & COMMENTS ☐ INCORPORATION ☒ INFORMATION

DOCUMENTS ENCLOSED: - Final Site Inspection Report for Fort Bliss, El Paso, Texas,
dated March 2011 by TLI Solutions, Inc.

REMARKS: All,

Included is the Final Site Inspection Report for Fort Bliss for your use. All comments that were received on the Draft SI Report have been addressed. However, any remaining questions on the responses should be sent to me electronically (b) (6) or by fax or mail, no later than April 7, 2011 (1 week).

Sincerely,

(b) (6)

If you have any questions, please let me know.

FROM: (b) (6)
Project Manager

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**FINAL SITE INSPECTION REPORT
FORT BLISS
EL PASO, TEXAS**

MARCH 2011

Prepared For:

U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J Street
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FINAL SITE INSPECTION REPORT FORT BLISS, EL PASO, TEXAS

General Services Administration (GSA) Schedule Number: GS-10F-03435
Delivery Order No. W91238-08-F-0011

Reviewed and Approved by:

(b) (6)

(b) (6)

Project Manager
TLI Solutions, Inc.

(b) (6)

(b) (6)

Technical Team Lead
TLI Solutions, Inc.

TLI Solutions, Inc. prepared this report at the direction of the U.S. Army Corps of Engineers (USACE). This document should be used only with the approval of USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

March 2011

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EXECUTIVE SUMMARY

SITE BACKGROUND

The Former Maneuver Area Munitions Response (MR) site was used for various training purposes from approximately 1939 into the 1970s. Based on the historical research, munitions reported to have been used at the site included aerial rockets (smoke and white phosphorus), practice guided missiles, bombs, and small arms (M1 - .30 caliber, M2 - .50 caliber, M16 – 5.56 mm, and M14 – 7.62 mm) blanks and live fire. Smoke grenades, pyrotechnics of various unidentified types, and other types of simulators were used during training activities in this area.

The area was to be available for anti-aircraft artillery maneuvers and portions of the Former Maneuver Area MR site were portrayed in historical documents as tactical maneuver areas for high-level bombing and strafing missions. Battle conditioning of troops was accomplished within maneuver areas. Infiltration courses were constructed to provide an area of ground on which troops could crawl under barbed wire while being subjected to nearby explosions and overhead machine gun fire.

SITE INSPECTION ACTIVITIES AND RESULTS

SI field activities conducted at the Former Maneuver Area in support of the Military Munitions Response Program (MMRP) included a visual survey of the collection of four surface soil composite samples and 16 incremental samples (IS), including two quality control (QC) samples. It was determined prior to the start of field activities that visual surveys would be conducted within 16 locations within the site. Approximately 133 line miles of visual surveys were conducted at twelve of the sixteen areas (Areas 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, and 15). The field team was unable to access the remaining four areas (1, 3, 8a, and 12) due to road conditions or locked gates. The results of these activities are summarized below:

- No MEC was identified during the visual survey
- MD identified at the site in Areas 4, 5, 6, 9, 10, 11, and 14 included:
 - HE detonation fragment
 - Fragments and fuzes from 4.2-inch mortar shells
 - .30-06 blank shell casings
 - 5.56 mm blank shell casings
 - 7.62 mm blank shell casings
 - .30 caliber blank shell casings
 - The top from an expended smoke grenade
 - '03 Springfield Stripper Clips
 - M104 illuminating flare canister lid
 - Machine gun links (.30-06, M60, .30 caliber)
 - Belt starter tabs
 - M14 Rifle Clip
 - M1 Garand Clips

- A live small arms round (.30-06 complete ball cartridge) was identified in Area 11
- Evidence of military activity including a military tent stake, chemical lights, communication wire, and a grounding rod for a generator was identified in Area 14 of the site
- No subsurface anomalies were identified
- Analytical results for metals indicated that all concentrations were below the applicable screening criteria
- No explosive compounds were detected in any of the samples

FUDS MMRP ELIGIBILITY

Based on the available historical records, it appears that the majority of the property associated with the Former Maneuver Area MR site was relinquished from use by the Army by 1980. The only exception is a tract of land (Block 79, Township 2, Sections 15, 16, and 21) that was under lease from the State of Texas from 1978 through 1987. Therefore, because the majority of the site was not under control or being used by the Army as of the October 1986, this area is eligible for the Formerly Used Defense Sites (FUDS) MMRP. However, the tract of land that was leased from the State until the end of 1987 is not eligible for the FUDS MMRP.

RECOMMENDATIONS

Table ES-1 presents a summary of the SI recommendations for the Former Maneuver Area MR site and the corresponding Army Environmental Database-Restoration (AEDB-R) numbers and site acreages. In general, it is recommended that this site be identified as a Munitions Response Area (MRA) and divided into two MR sites, the area adjacent to the installation boundary (Former Maneuver Area A) and the remainder of the Former Maneuver Area (Former Maneuver Area B). Former Maneuver Area A is recommended for additional investigation for MEC based on the identification of a mortar impact area, a firing position, and a fighting position. Former Maneuver Area A is recommended No Further Action (NFA) for MC based on the results of the field activities conducted for this SI. Former Maneuver Area B is recommended for NFA for MEC and MC based the results of the field activities conducted for this SI.

Table ES-1: Site Inspection Results and Recommendations

MR Area/Site	Range Inventory Acreage	HRR Acreage	SI Acreage	Recommendation	Basis for Recommendation (MEC)	Basis for Recommendation (MC)
Former Maneuver Area Munitions Response Area (MRA) (FTBLS-002-R)	73,538.6	72,520.82				
Former Maneuver Area A MR site (FTBLS-002-R-01)		Based on the review of the available land acquisition documents and more accurate GIS data, the acreage associated with the MR site was revised.	24,459.18	Former Maneuver Area A is recommended for additional investigation for MEC and recommended for NFA for MC. Based on the historical information that indicates the property associated with the Former Maneuver Area A MR site was relinquished by the Army by 1980, it is recommended that the site be further investigated under the FUDS MMRP.	MD was identified during the visual survey at the MR site. Evidence of military activities, including a mortar impact area, firing position, and fighting position, was identified.	Analytical results for metals indicate that all sample concentrations are below applicable screening criteria and no explosive compounds were detected.
Former Maneuver Area B MR site (FTLBS-002-R-02)			48,061.64	Former Maneuver Area B is recommended for NFA for MEC and MC.	No MEC was identified during the visual survey. Only small arms MD was observed at the site.	Analytical results for metals indicate that all sample concentrations are below applicable screening criteria and no explosive compounds were detected.

ACRONYMS AND ABBREVIATIONS

AEDB-R	Army Environmental Database – Restoration
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CLP	Contracts Laboratory Program
COC	Contaminant of Concern
CSM	Conceptual Site Model
CTC	Cost to Complete
CTT	Closed, Transferred, and Transferring
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoD	Department of Defense
DoD QSM	Department of Defense Quality Systems Manual, Version 3
DOE	Department of Energy
DQO	Data Quality Objective
ELAP	Environmental Laboratory Accreditation Program
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
FS	sulfur-trioxide chlorosulfonic acid solution
FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
FTBLS	Fort Bliss
GPS	Global Positioning System
GSA	General Services Administration
HMX	Octogen
HRR	Historical Records Review
HTRW	Hazardous, Toxic, and Radioactive Waste
ICS	Interference Check Sample
INPR	Inventory Project Report
IS	Incremental Sample
J	Estimated Value
kg	Kilograms
LQ	Laboratory Qualifier
M	Manual integrated compound
MC	Munitions Constituent
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MDL	Method Detection Limit
mg/kg	Milligram Per Kilogram
mm	Millimeter
MMRP	Military Munitions Response Program
MR	Munitions Response
MRA	Munitions Response Area
MRS	Munitions Response Site

ACRONYMS AND ABBREVIATIONS (concluded)

MRSP	Munitions Response Site Prioritization Protocol
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	Mean Sea Level
NA	Not Applicable
NC	Nitrocellulose
NELAP	National Environmental Laboratory Accreditation Program
NFA	No Further Action
NG	Nitroglycerin
OE	Ordnance and Explosives
PA	Preliminary Assessment
PETN	Pentaerythritol tetranitrate
Q	One or more quality control criteria failed
QA	Quality Assurance
QC	Quality Control
RDX	Cyclotrimethylene trinitramine
RI/FS	Remedial Investigation/Feasibility Study
ROE	Right-of-Entry
RSD	Relative Standard Deviation
RSL	Regional Screening Levels
SARA	Superfund Amendment and Reauthorization Act
SI	Site Inspection
SW	Solid Waste
TAL	Target Analyte List
TCEQ	Texas Commission on Environmental Quality
TCL	Target Compound List
Tetryl	Trinitrophenylmethylnitramine
TLI	TLI Solutions, Inc.
TNB	Trinitrobenzene
TNT	Trinitrotoluene
TPP	Technical Planning Process
U	The analyte was not detected above the reporting limit
UJ	Non-detected results qualified as estimated
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
VQ	Validation Qualifier

GLOSSARY OF TERMS

Closed Range – A military range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. A closed range is still under the control of a Department of Defense (DoD) component.

Defense Site – Locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions.

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance (UXO), military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations.

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of UXO and of other munitions that have become an imposing danger, for example, by damage or deterioration.

Explosives Safety – A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects of risks of potential mishaps involving military munitions.

Formerly Used Defense Site (FUDS) – A DoD program that focuses on compliance and cleanup efforts at sites that were formerly used by the DoD. A FUDS property is eligible for the Military Munitions Response Program if the release occurred prior to October 17, 1986; the property was transferred from DoD control prior to October 17, 1986; and the property or project meets other FUDS eligibility criteria.

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, United States Coast Guard, Department of Energy (DOE), and National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; chemical munitions; rockets; guided and ballistic missiles; bombs; warheads; mortar rounds; artillery ammunition; small arms ammunition; grenades; mines; torpedoes; depth charges; cluster munitions and dispensers; demolition charges; and devices and components thereof. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the DOE after all required sanitization operations under the Atomic Energy Act of 1954 (42 United States Code [U.S.C.] 2011 et seq.) have been completed.

GLOSSARY OF TERMS (continued)

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, DMM or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101 (e)(5); (B) DMM, as defined in 10 U.S.C. 2710(e)(2); or munitions constituents (e.g., Trinitrotoluene [TNT], Cyclotrimethylene trinitramine [RDX]), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Response – Response actions, including investigation, removal actions and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC), or to support a determination that no removal or remedial action is required.

Munitions Response Area (MRA) – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS) – A discrete location within an MRA that is known to require a munitions response.

Operational Range – A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities or, although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. Also includes: “military range”, “active range”, and “inactive range” as those terms are defined in 40 Code of Federal Regulations (CFR) 266.201.

Other Than Operational Range – Applies to all lands within the installation boundaries that are not designated as "Operational Range". These lands may include, but are not limited to, Closed and Transferring Munitions Response (MR) sites, housing areas, administrative areas, schools, recreation areas, etc.

GLOSSARY OF TERMS (concluded)

Range – A designated land or water area set aside, managed, and used for range activities of the DoD. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration.

Transferred Range – A range that is no longer under military control and had been leased by the DoD, transferred, or returned from the DoD to another entity, including federal entities. This includes a military range that is no longer under military control, but that was used under the terms of an executive order, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager. Additionally, property that was previously used by the military as a range, but did not have a formal use agreement, also qualifies as a transferred range.

Transferring Range – A range that is proposed to be leased, transferred, or returned from the DoD to another entity, including federal entities. This includes a military range that was used under the terms of a withdrawal, executive order, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager or property owner. An active range will not be considered a transferring range until the transfer is imminent (generally defined as the transfer date is within 12 months and a receiving entity has been notified).

Unexploded Ordnance (UXO) – Military munitions that: (a) have been primed, fused, armed, or otherwise prepared for action; (b) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (c) remain unexploded either by malfunction, design, or any other cause.

Section 1

1.0 ACKNOWLEDGMENTS

TLI Solutions, Inc. (TLI) would like to acknowledge and extend our gratitude to the following individuals who supported the Site Inspection (SI) activities for this project:

Fort Bliss

(b) (6), Installation Restoration Program Manager
(b) (6), Multimedia Compliance, Chief
(b) (6), Environmental Attorney
(b) (6), Archaeologist
(b) (6), Historical Architect and Tribal Liaison

U.S. Army Environmental Command (USAEC)

(b) (6), Program Manager
(b) (6), Environmental Restoration Manager

U.S. Army Corps of Engineers, Sacramento District (USACE – Sacramento District)

(b) (6), Project Manager

U.S. Environmental Protection Agency

(b) (6)

Texas Commission on Environmental Quality (TCEQ)

(b) (6)

Texas Parks and Wildlife Department

(b) (6)

Texas General Land Office

(b) (6)

El Paso County

(b) (6)

Hudspeth County

(b) (6)

City of El Paso

(b) (6)

(b) (6)

Montana Vista

(b) (6)

Ysleta Del Sur Pueblo

(b) (6)

Mescalero Apache Tribe

(b) (6)

Comanche Nation

(b) (6)

Kiowa Tribe of Oklahoma

(b) (6)

Franklin Mountains Wilderness Coalition

(b) (6)

Fronterra Land Alliance

(b) (6)

Section 2

2.0 INTRODUCTION

The United States (U.S.) Congress established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and former defense sites. Properties classified as operational military ranges, permitted munitions disposal facilities, or operating munitions storage facilities are not eligible for the MMRP.

The U.S. Army's inventory of closed, transferred, and transferring (CTT) military ranges and defense sites (also known as the Phase 3 Range/Site Inventory) with munitions and explosives of concern (MEC) (which includes both UXO and DMM) and/or MC that are eligible for action under the MMRP. Five sites associated with Fort Bliss were initially identified during the Phase 3 Range/Site Inventory: Dona Ana Range-McNew Surplus, Former Maneuver Area (previously known as Maneuver Areas No. 1 and No. 2), Winfree's Nose, Closed Castner Firing Range, and Castner Range-XD. A sixth site, Fort Bliss Dona Ana Range, was identified during the Phase 3 Range/Site Inventory as being associated with the New Mexico National Guard enclave located in the northern portion of Fort Bliss; however, through subsequent evaluation, it was determined that this site was part of an operational range area and therefore not eligible for the MMRP. An SI was completed for the remaining five Munitions Response (MR) sites in April 2007 (*Final Site Inspection Report, Fort Bliss, Texas* by e2M, dated January 2007 [revised April 2007]). During the 2007 e2M SI, four sites were determined to be eligible for the Formerly Used Defense Sites (FUDS) MMRP, including the Former Maneuver Area MR site; Castner Range-XD, Winfree's Nose, and Dona Ana Range-McNew Surplus. Subsequent to the 2007 e2M SI, it was determined that only a portion of the Former Maneuver Area MR site was eligible for FUDS. As a result, it was determined that an SI would be completed for the Former Maneuver Area MR site under the active Army MMRP.

The Department of Defense (DoD) is currently establishing policy and guidance for munitions response actions under the MMRP. However, key program drivers developed to date conclude that munitions response actions will be conducted under the process outlined in the National Contingency Plan (40 Code of Federal Regulations 300) as authorized by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 United States Code (U.S.C.) 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99-499 (hereinafter CERCLA). The two Phase 3 Range/Site Inventory Reports for Fort Bliss (Range Inventory Reports), completed in November 2002 by TechLaw, Inc. and January 2003 by e2M, mark the completion of the Preliminary Assessment (PA) phase of work under CERCLA. The SI is the next step of the CERCLA process and will complete the PA/SI requirement for the Former Maneuver Area MR site.

This report presents the results of the MMRP SI conducted at Fort Bliss by TLI. The SI was conducted in support of USACE-Sacramento District and USAEC under Delivery Order No. W91238-08-F-0011. Overall coordination of the SI and contract management

was provided by the USACE–Sacramento District/South Pacific Division Range Support Center.

The SI was completed in two phases. The Historical Records Review (HRR) was the initial step in the MMRP SI process. In October 2009, TLI submitted the Final HRR to Fort Bliss and all stakeholders. The primary goal of the HRR was to perform a records search to document historical and other known information for the Former Maneuver Area MR site at Fort Bliss in order to supplement the information developed during the Phase 3 Range/Site Inventory and to support the Technical Project Planning (TPP) process. As a result of the HRR, the site boundary was modified from the 73,538.6 acres identified in the Range Inventory Report to 72,520.82 acres. The information presented in the HRR helped to facilitate decision-making processes to determine the next steps to be taken in the SI process for the Former Maneuver Area MR site at Fort Bliss. The information obtained during the HRR is summarized in Section 3.0 of this report.

The second phase of the SI was the completion of field activities from October 4 – 8, 2010. Field activities included visual surveys and surface soil sampling. The approach used during the field activities and results of the field activities are presented in Sections 4.0 and 5.0 of this report.

2.1 SITE OVERVIEW

Fort Bliss is located in El Paso County in western Texas (Figure 2-1). The installation also encompasses training and maneuver areas that extend into Otero and Dona Ana counties of New Mexico. The Sacramento Mountains lie along the installation's northernmost boundary; the city of El Paso, the Franklin Mountains, the Organ Mountains, and San Andreas Mountains are located to the west; the Otero Mesa, McGregor Range and Hueco Mountains run through the eastern portion of the installation; the Tularosa Valley runs through the western portion; and Carlsbad Highway (U.S. Highway 62) runs along the southern boundary. The installation consists of approximately 1,088,000 acres of land and is the Army's second largest installation.

The primary mission of Fort Bliss is to train, sustain, mobilize, and deploy members of the joint team to conduct global, full spectrum operations in support of the national military strategy while providing for the well-being of the regional military community. Furthermore, Fort Bliss is one of DoD's flagship installations comprised of state-of-the-art training areas, ranges, and facilities; led by adaptive, innovative, and warrior focused professionals concentrated on individual and unit readiness, leaders development, deployment, security, and the well-being of its members.

The Former Maneuver Area MR site at Fort Bliss, a transferred site comprised of portions of two adjacent former maneuver areas that encompasses 72,520.82 acres, is located east of the Fort Bliss cantonment area and adjacent to the southeastern installation boundary of Fort Bliss. The MR site is located in the Basin and Range physiographic province which is characterized by isolated, nearly parallel mountain ranges separated by broad, flat basins. The Hueco Mountains are located in the eastern portion of the Former



Site Inspection Fort Bliss, TX



Figure 2-1

Installation Location Map

Legend

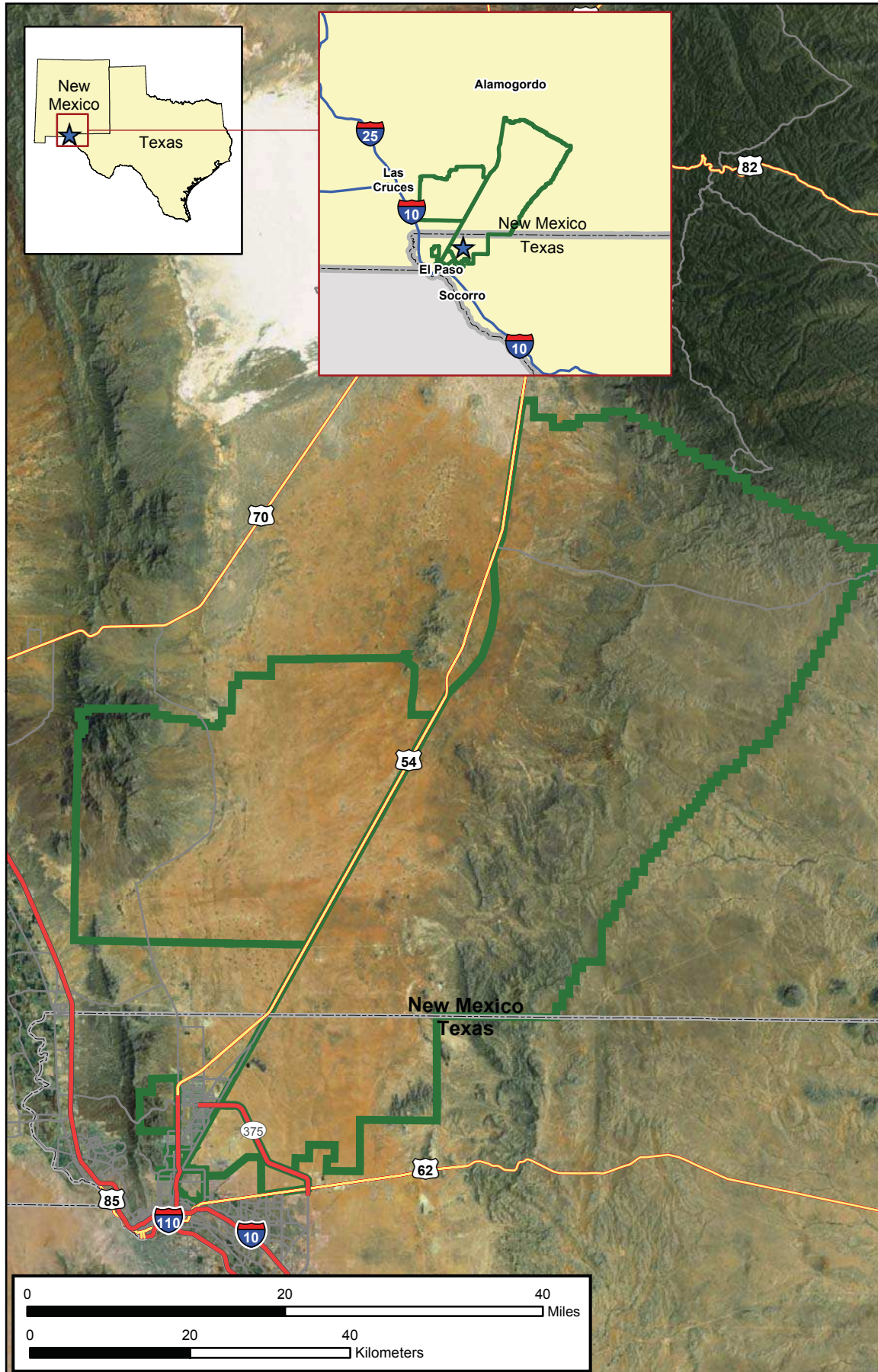
- Installation Boundary
- State Lines
- Major Roads**
- Road Classification**
- Limited Access
- Highways
- Secondary Roads



Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008

Edition: Final Report

Date: March 2011



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Maneuver Area MR site with Hueco Tanks State Park and Historic Site being located west of the Hueco Mountains. Hueco Tanks are an area of large natural rock basins or "huecos" that furnish a supply of trapped rain water. Commercial property, a large tank farm, residential property, Hueco Tanks State Park and Historic Site, and two quarry operations also comprise portions of the site.

2.2 PURPOSE, SCOPE, AND OBJECTIVES

The purpose of the SI is to determine if there is sufficient evidence to determine the presence or absence of UXO, DMM, or MC related to past military activities at the site. The goal of the SI is not to confirm all types of UXO or DMM present, nor to define the nature and extent of contamination at a particular site. The primary goal of the MMRP SI is to collect the appropriate amount of information necessary to make one of the following decisions:

- 1) Whether further investigation, such as a Remedial Investigation/Feasibility Study (RI/FS), is required at a site;
- 2) Whether an immediate response is needed; or
- 3) Whether the site qualifies for No Further Action (NFA).

The secondary goals of the SI are to collect the necessary information required to improve Cost to Complete (CTC) estimates for the remediation of MR sites and to complete the Munitions Response Site Prioritization Protocol (MRSP). The MRSP assigns a priority to each site based on the overall conditions at each location, taking into consideration various factors relating to safety and environmental hazard potential. The priority assigned to each site is based on the scores of three hazard evaluation modules. The scores for the Former Maneuver Area MR site are summarized in Table E-1, included in Appendix E of this SI report. The complete MRSP evaluation forms are also included electronically in Appendix E.

The Scope of Work for the MMRP activities at Fort Bliss designated that the following tasks were to be completed:

- Conduct HRR and produce report
- Coordinate all efforts with stakeholders/follow USACE TPP process
- Develop Site-specific Work Plan for SI activities
- Conduct SI field activities
- Develop SI report

Records reviewed for the HRR delineated the site boundaries, training areas, and various munitions types. This information was developed through historical records review conducted at multiple document repositories and by conducting interviews with individuals knowledgeable about the operations conducted at these sites. The scope for the SI field activity was developed based on information discussed during the TPP meeting held with the Fort Bliss stakeholders in October 2009 as well as the information summarized in the October 2009 *Final Historical Records Review Fort Bliss, El Paso*,

Texas and the May 2010 Final Site Inspection Work Plan, Fort Bliss, El Paso, Texas.
Field activities included visual surveys conducted with the use of hand-held metal detectors and collection of surface soil samples. No intrusive work was conducted during this phase of the field activities.

2.3 REPORT ORGANIZATION

This SI Report has the following sections:

- Section 1 – Acknowledgements
- Section 2 – Introduction
- Section 3 – Site Description
- Section 4 – Site Inspection Tasks
- Section 5 – Site Inspection Findings
- Section 6 – Conceptual Site Model
- Section 7 – Summary and Conclusions
- Section 8 – Recommendations
- Section 9 – References

The following supporting information and analyses are appended to this SI Report:

- Appendix A – Analytical Data
- Appendix B – Data Validation Reports
- Appendix C – Photographic Log
- Appendix D – Field Notes
- Appendix E – Munitions Response Site Prioritization Protocols
- Appendix F – Munitions Response Site Prioritization Protocol Notification Letter and Public Announcement
- Appendix G – Technical Project Planning Meeting Minutes
- Appendix H – Public Meeting Summary Notes
- Appendix I – Summary of Rights of Entry Contacts
- Appendix J – Electronic Files

Section 3

3.0 SITE DESCRIPTION

The following sections provide a description of the Former Maneuver Area MR site at Fort Bliss. Figure 3-1 depicts the location of the MR site identified as a result of the Final HRR and the Final Work Plan. A brief description of the site is included below. Additional information regarding the site, along with the supporting documents, is included in the Final HRR.

3.1 FORMER MANEUVER AREA MR SITE (FTBLS-002-R-01)

According to the 2003 Range Inventory Report, the Former Maneuver Area MR site was a transferred site comprised of portions of two adjacent former maneuver areas that encompassed 73,528.6 acres. The 2003 Range Inventory Report indicates that the MR site is located east of the Fort Bliss cantonment area, adjacent to the southeastern installation boundary of Fort Bliss. Portions of the historic maneuver areas associated with the MR site are located within the installation boundary of Fort Bliss and are still (as of November 2010) designated as operational range area. Data collected for the 2003 Range Inventory Report indicated that this site was used for various training purposes from approximately 1939 into the 1970s. Munitions reported to have been used at the site included aerial rockets (smoke and white phosphorous), practice guided missiles, bombs, and small arms. It should be noted that information regarding the use of the aerial rockets, practice guided missiles, and bombs within the Former Maneuver Area MR site was not substantiated during the review of historical records for the HRR.

According to the 2007 e2M SI, portions of the MR site are currently used as commercial property and as part of the airport for the city of El Paso. However, according to information obtained in support of the HRR, it has been determined that the airport is not part of the MR site; whereas commercial property, a large tank farm, residential property, Hueco Tanks State Park and Historic Site, and two quarry operations do comprise portions of the site.

Based on information obtained during research for the HRR, there were several modifications made to the Former Maneuver Area MR site boundary. As a result of these modifications, the acreage of the MR site has been decreased from 73,528.6 acres to 72,520.82 acres.

3.1.1 Munitions Response Site Description

Property associated with the Former Maneuver Area MR site was first acquired by Fort Bliss as early as 1936. The land was acquired in association with historical training areas known as the Expansion of Facilities Area (also known as Maneuver Area No. 1) and Maneuver Area (also known as Maneuver Area No. 2).

During the early part of 1943, critical training regarding battle conditioning of troops was accomplished within maneuver areas at various posts under the Antiaircraft Command, including Fort Bliss. Infiltration courses were constructed at maneuver areas to provide an

area of ground on which troops could crawl under barbed wire while being subjected to nearby explosions and overhead machine gun fire.

Several landing strips, which may have been used for military training activities, have been identified within the Former Maneuver Area MR site during its period of operation. An emergency landing strip and landing strips designated as Landing Strip Number 2 (which is not located within the MR site but is located within Maneuver Area No. 2), Landing Strip Number 3, and Landing Strip Number 4 appeared on maps and aerial photographs dated from 1943 to 1964.

Two locations identified in the historic documents as Little Tokyo and Yokohama Mock-up Fortification were located north of the boundary of the Former Maneuver Area MR site (within what is currently the operational range area of Fort Bliss) and were used for small arms and divisional artillery training in the 1940s and 1950s. In addition, techniques for attacking houses and villages were used. Weapons used at the Yokohama site are known to have included M1 rifles and .30 caliber live ammunition. Photographs 3-1 through 3-3 depict these training areas and activities. Although these two sites are located just north of the MR site boundary, due to the scale and nature of the training activities that occurred here, it is possible that similar activities occurred within the nearby MR site.



Photograph 3-1: Little Tokyo (1943)

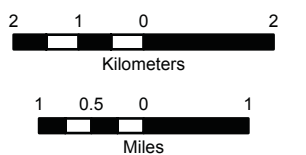
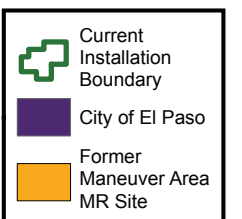
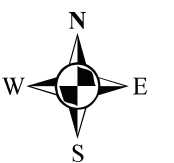
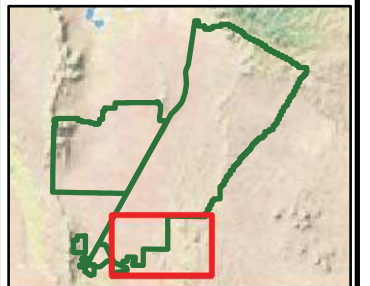
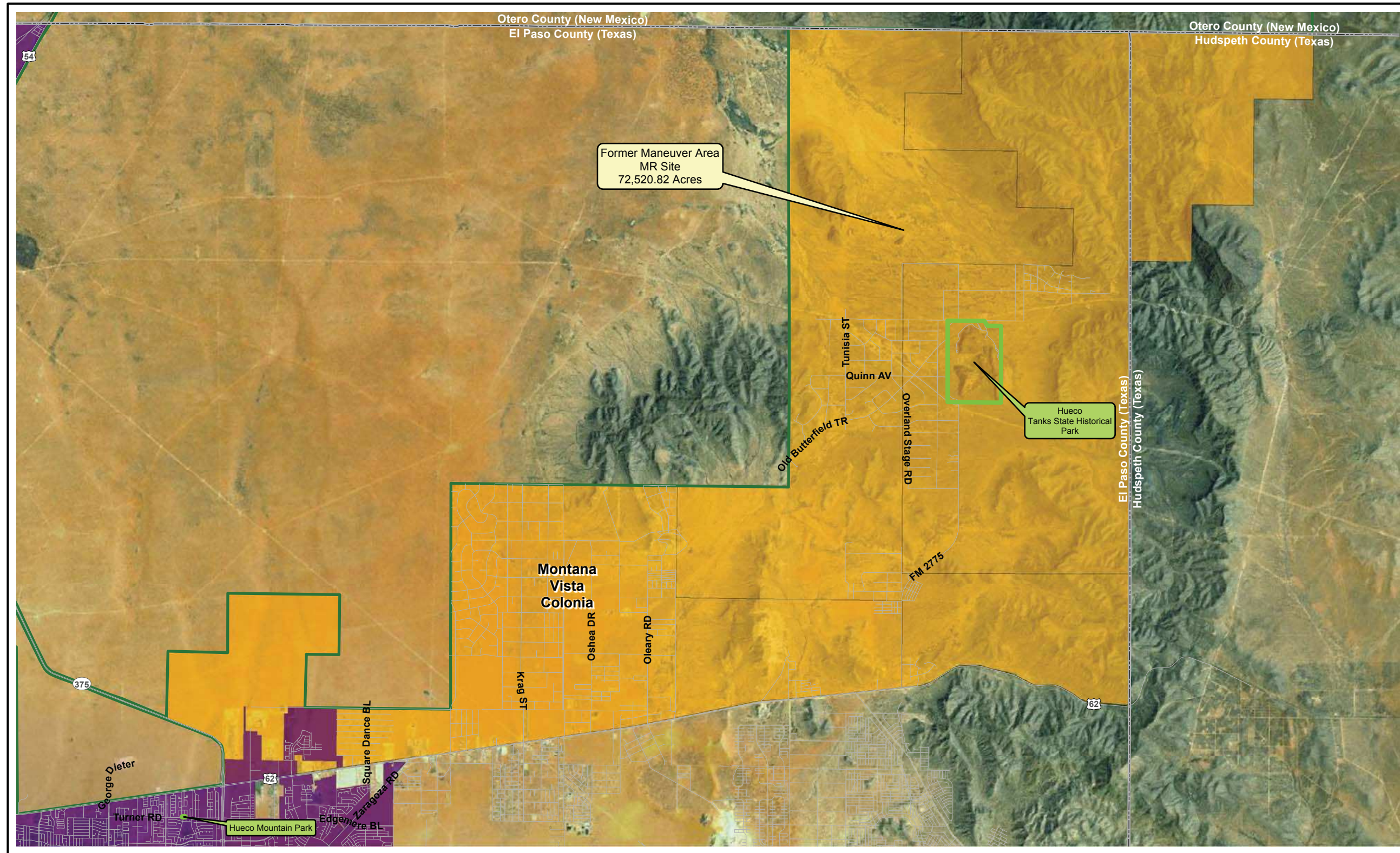


Site Inspection Fort Bliss, TX



Figure 3-1

Former Maneuver Area
MR Site Location Map



Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008
Edition: Final Report
Date: March 2011

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Photograph 3-2: Training in Mock Village (1951)



Photograph 3-3: Firing at Target in Mock Village (1951)

When the Maneuver Area was reacquired in 1949, the area was to be available for anti-aircraft artillery maneuvers. Prior to acquisition of the land, it was indicated that there would be no firing of live ammunition on or over the area so as not to cause interference to existing air lanes. According to a letter dated 1949, the maneuver areas at Fort Bliss were considered adequate at the time for tactical field training of units and that unspecified previous restrictions in conducting tactical field exercises had been eliminated. In another letter from 1949, it was stated that the equipment to be used during anti-aircraft

maneuvers would include track-type vehicles, trucks, jeeps, and staff cars. No firing of live ammunition on or over the range was to be allowed.

In December 1951, portions of the Former Maneuver Area MR site were portrayed in historical documents as tactical maneuver areas for high-level bombing and strafing missions. According to the historical documents, the only portion of the MR site designated for high-level bombing training was the westernmost area of the site. It is unlikely that this area would have been used for bombing training based on its proximity to Highway 62 and the presence of ranching activities. Strafing is the practice of attacking ground targets from low-flying aircraft; usually applied to attack with aircraft-mounted automatic weapons. The term is sometimes applied to the firing of non-airborne automatic weapons while moving. The types of weapons used in strafing practice would only use small arms munitions. Specific descriptions of these events actually occurring within the MR site do not appear in the historical documents. However, a historical photograph from 1951 (Photograph 3-4) depicts a Browning M2 .50 caliber machine gun set up in an anti-aircraft emplacement in the vicinity of Hueco Tanks (an area of large natural rock basins or "huecos" that furnish a supply of trapped rain water [Note: unless otherwise stated, use of the term "tanks" in this report refers to areas comprised of "huecos"].).



Photograph 3-4: Anti-aircraft Artillery Training at Hueco Tanks (1951)

Based on available information, it is possible that aircraft would fly to the landing strip by Hueco Tanks and anti-aircraft artillery troops on the ground would fire at targets towed by the aircraft. Current information provided by the Hueco Tanks State Park and Historic Site Superintendent indicates that no evidence of the anti-aircraft emplacement is still visible. The Superintendent provided a current photograph of the area depicted in the historical photograph (Photograph 3-5).



Photograph 3-5: Area Previously Used for Anti-aircraft Artillery Training at Hueco Tanks (October 2009)

Additional training conducted in the vicinity of Hueco Tanks during the 1940s and 1950s involved M1 .30 caliber rifles. Based on a historical photograph (Photograph 3-6), it is assumed that smoke grenades and other types of simulators were also used during training activities in this area.



Photograph 3-6: Training Activity at Hueco Tanks (1951)

According to a 1963 letter, much of the unit training conducted at Fort Bliss consisted of air defense artillery training. An important part of this training – the detection, identification, tracking, and simulated engagement of aerial targets – was conducted in the maneuver areas. Maneuver Area No. 2 was described as providing the best site for air

defense artillery training because of its location. Maneuver Area No. 2 provided the necessary dispersion for field training of air defense battalions, simulated nuclear warfare training, black-out motor marches, and prevented interference between units during aggressor ground and air activities. It also provided better terrain variations than any other training area available at the time and was particularly valuable for field training of units in the reconnaissance, selection, and occupation of position.

Figure 3-2 depicts the locations of Landing Strips No. 1-4, Little Tokyo, Yokohama Mock Up Village, and the Anti-aircraft Artillery Training at Hueco Tanks.

Munitions that may have been used at the Former Maneuver Area MR site include weapons such as the M1 (.30 caliber), M2 (.50 caliber), M16 (5.56 mm), M14 (7.62 mm), small arms blanks, and pyrotechnics of various unidentified types. Table 4-4 at the end of this section summarizes this information in detail.

3.1.2 Previous Investigations

According to a Dud Disposal Team Operations Report dated May 13, 1946, the Maneuver Area was searched and cleared of duds along with several other areas, totaling 73,000 acres. In this search, 106 high explosive duds and 3.5 tons of scrap were removed from the total 73,000 acres. No specific items were listed for the Maneuver Area in the historical document. Of the 73,000 total acres surveyed, only 1,280 acres of the Maneuver Area were surveyed for decontamination. At this time, the Maneuver Area consisted of approximately 125,000 acres. There is no indication in the historical document about which portion of the Maneuver Area was cleared. As a result of the clearance, a signed Certificate of Clearance was requested for the 118,677-acre surplus portion. The Certificate of Clearance subsequently provided by the Officer in Charge of the Bomb Disposal Team that performed the clearance (dated August 22, 1946) stated that the area that was surface-searched for duds is the area on which firing has taken place and that the cost to the government in searching the remaining portion of the area would exceed the value of the land.

Volunteers from post units, Fort Bliss Rod and Gun Club, and 41st Explosive Ordnance Disposal (EOD) conducted a survey for levels of dud contamination of two areas; the Lake Tank Area, and the Three Buttes Area, according to the installation's Annual Historical Summary for 1978. The areas were to be used during bird hunting season. The Lake Tank Area was completely cleared of any contamination, but only a small section of the Three Buttes Area was considered clear of munitions contamination.

According to a November 1992 order regarding Operation Range Cleanup, units at Fort Bliss were scheduled to conduct a cleanup of "hot spots" at McGregor maneuver ranges between November 1992 and February 1993. This historical document is the same source document referred to for previous reports' assertions that several "hot spots" within Maneuver Area No. 1 and No. 2 were cleared in 1992 and 1993. However, upon further review it is apparent that the areas cleared were unrelated to the Former Maneuver Area MR site, but instead were portions of Maneuver Area No. 1 and Maneuver Area No. 2 that lay outside the MR site boundary and within the operational range area of Fort

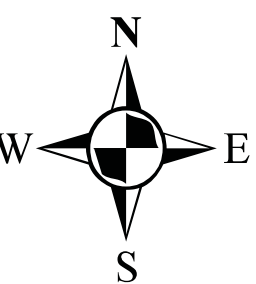
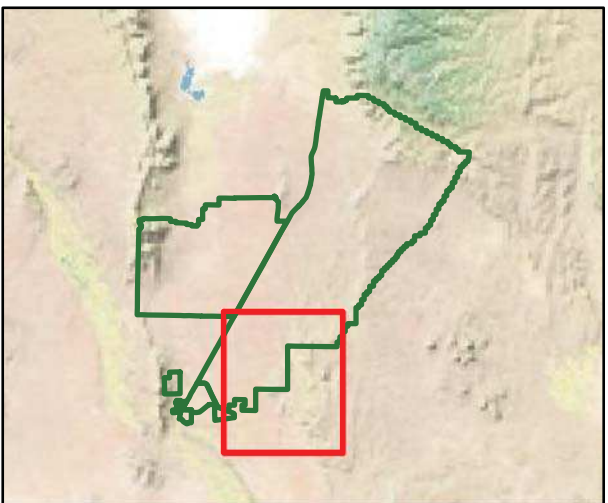
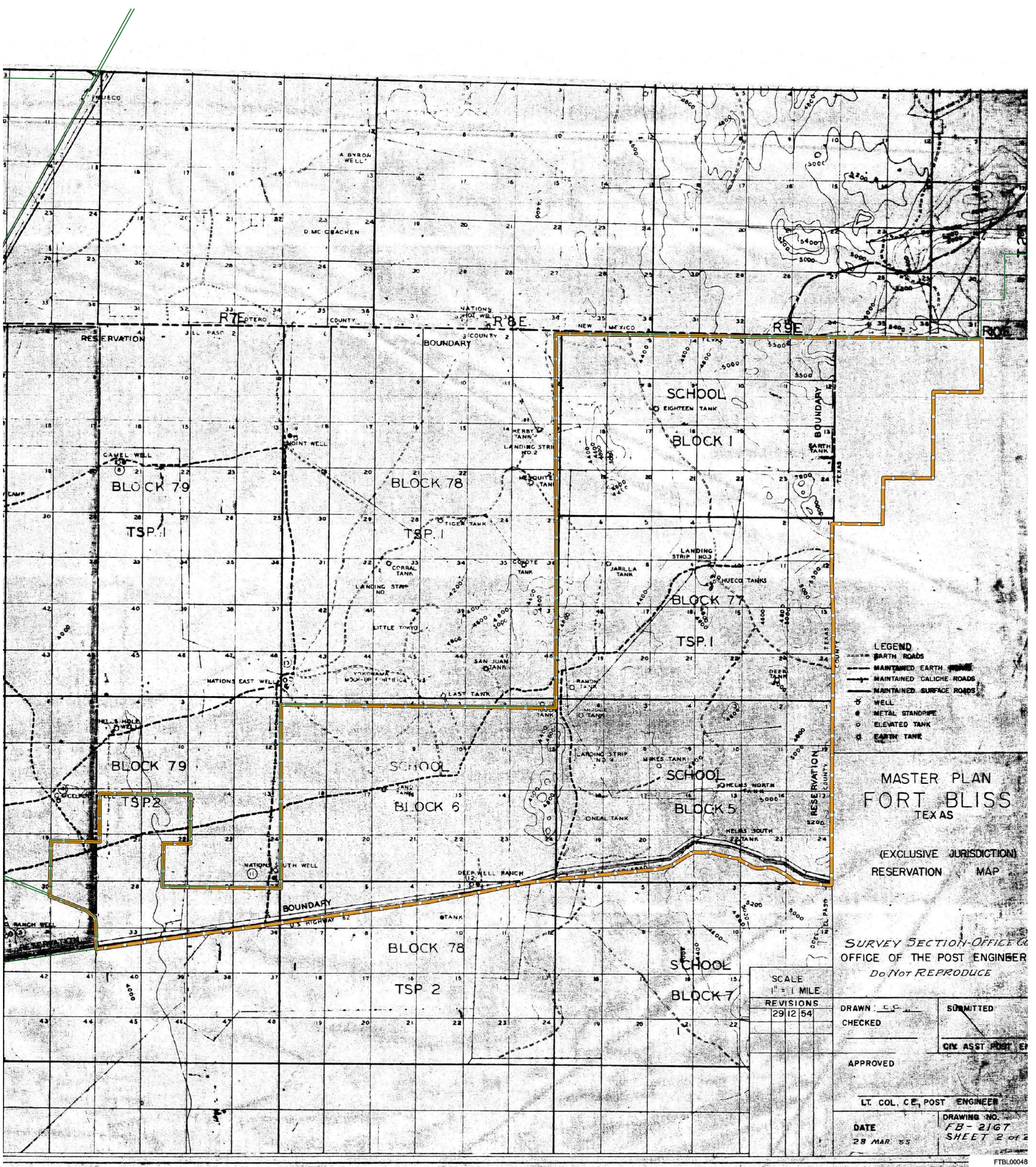
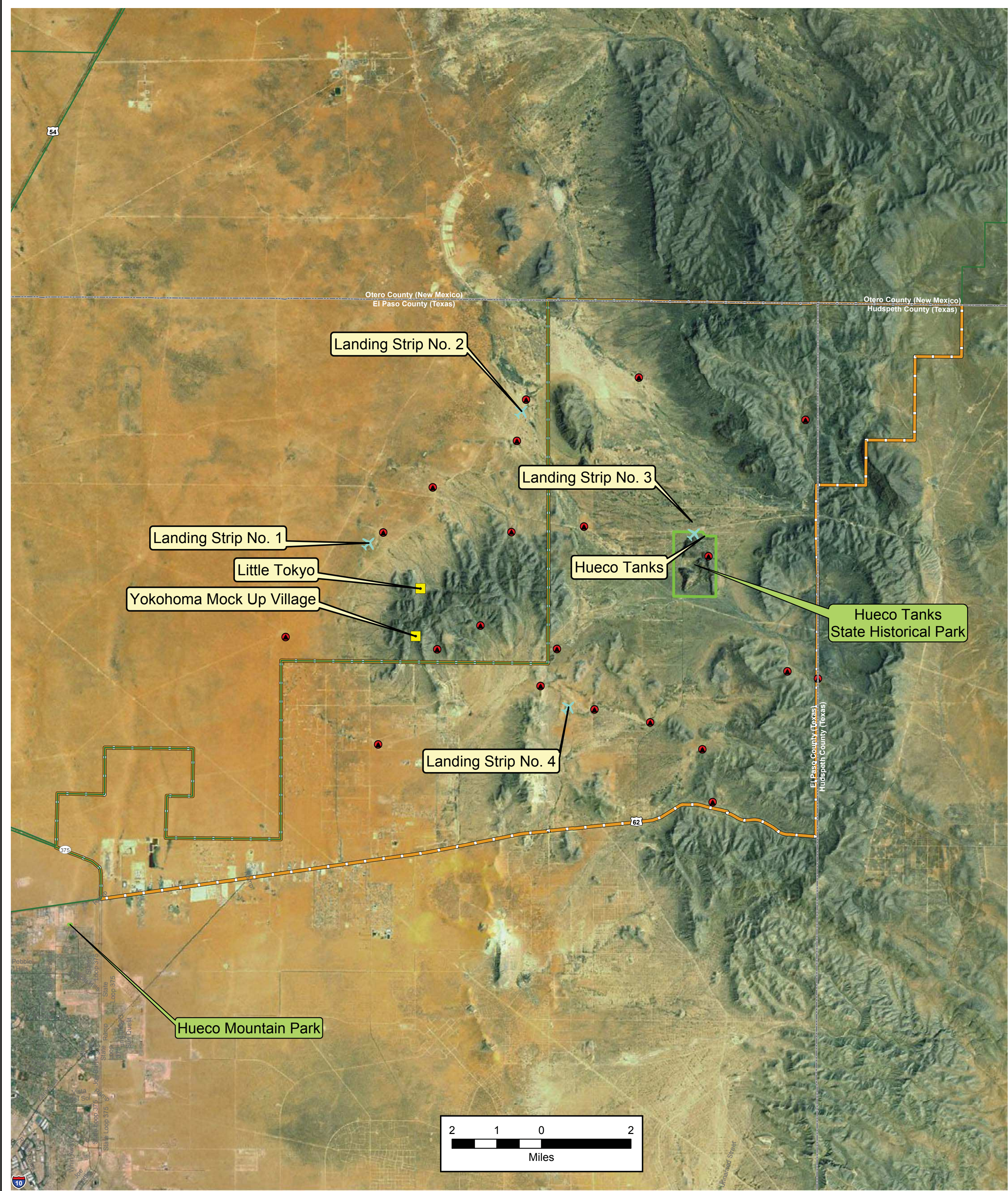


Site Inspection
Fort Bliss, TX



Figure 3-2

Features within the
Former
Maneuver Area
MR Site



- Current Installation Boundary
- Airstrip
- Water Tank
- Mock Fortification
- Former Maneuver Area MR Site

Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008

Source Documents:
FTBL00048 (2/28/1955)

Edition: Final Report

Date: March 2011

Bliss. Four of the forty-five designated “hot spots” were located within Maneuver Area No. 1, and eight were located on Maneuver Area No. 2.

Information provided by the Archeology Survey Team Leader, Texas Parks and Wildlife Department indicates that between 1999 and 2001 an intensive pedestrian survey was conducted on approximately 500 acres of level terrain surrounding North Mountain, West Mountain, East Mountain, and East Spur at Hueco Tanks State Park and Historic Site. The survey was conducted by archeologists from the Texas Parks and Wildlife Department. In addition to the surface survey, several shovel excavations were conducted. As a result of the pedestrian survey and shovel excavations, eight small arms munitions related items were uncovered (three on the surface and 5 in the shovel excavations). In addition, 28 small arms munitions items had previously been collected at the Hueco Tanks and are included in the park’s collection of artifacts. The state archeologists identified 19 of the total 36 items as being potentially related to military activities. In order to protect the locations of artifacts within the state park, the exact locations where munitions were found were not provided by the state archeologist. However, two-thirds of the finds were identified in the area to the northeast of North Mountain within the state park. Several items were also identified within the central area of the mountains to the east of the earthen dam that is located between North and West mountains.

The earliest munitions item identified by the state archeologists as being potentially associated with military activities was a centerfire cartridge case fragment from a 45-70 caliber cartridge that was adopted by the U.S. military as the official service cartridge for the “Trapdoor” Springfield single shot rifle from 1873 to 1892. Two military items dating from the World War II period in the 1940s were identified by the state archeologists. One was a .50 caliber machine gun shell casing and the other was a .30-06 cartridge. The most recent piece of military ammunition identified by the state archeologists was an unfired 5.56 mm centerfire cartridge from the early 1970s. The munitions items identified during the pedestrian survey were removed from the site by the state archeologist and added to the artifacts collection at the state park.

In December 2009, Fort Bliss received information from two property owners located south and southwest of the Hueco Tanks State Park and Historic Site that indicated they had munitions items located on their property. On one property, a rocket was observed (Photograph 3-7). Although TLI was unable to identify the specific type of rocket, it was determined that the item was approximately 6 feet long and 3 inches in diameter. This item appeared to have been expended and the nose cone was missing from the rocket; however, it was not possible to determine if the item contained any explosives. Fort Bliss contacted the El Paso Police Department Bomb Squad regarding the item and the Bomb Squad visited the site on December 9, 2009. According to the Senior Bomb Squad Technician, it was determined that the possible rocket had no explosive material inside. It was completely hollow. The item did not contain any labels or distinguishing features. The item was determined to be safe for transport and was removed from the property by the Bomb Squad. Based on the historical information regarding the MR site, there is no indication that rockets such as this one were ever used at the Former Maneuver Area MR

site. Therefore, it is likely that this item was transported to the property by the previous owner.



Photograph 3-7: Rocket (type undetermined) (December 2009)

The second property owner had found several munitions items on property that he had recently purchased south of the Hueco Tanks State Park and Historic Site. He did not know how the items originally were brought to the property. The munitions items included two ammunition cans containing .30 caliber blank M1909 bandoleers (Photograph 3-8). According the property owner, both cans were completely sealed when he found them; however, he had opened one of the cans to determine what it contained. The ammunition cans were transported by Fort Bliss personnel to the installation and were turned over to the Range Control liaison.

The other items found by the property owner included several types of simulators and smoke grenades. These items were unfired and appeared to be in poor condition (Photographs 3-9 and 3-10). The El Paso Police Department Bomb Squad visited the site on December 9, 2009 and identified three M116A1 Simulators, Hand Grenade; three AHM8 or ANM18 White Smoke Grenades; and three plastic cylinders that appeared to be simulators with electric matches as initiators. All the items appeared to be in poor condition. No lot numbers or nomenclature was visible. The Bomb Squad determined these items could not be transported safely; therefore, they were blown in place using a counter charge.



**Photograph 3-8: Ammunition Cans containing
.30 caliber blank rounds (December 2009)**



Photograph 3-9: White Smoke Grenade (December 2009)



Photograph 3-10: Simulator (December 2010)

3.1.3 FUDS MMRP Eligibility

According to the 2007 e2M SI, the Former Maneuver Area MR site was identified as FUDS eligible in the “Transmittal of Active Military Munitions Response Program (MMRP) Sites to the Formerly Used Defense Site (FUDS) Program” memorandum dated July 1, 2005. Therefore, the site was determined to require no further investigation under the Active Army MMRP and the site was not addressed during the 2007 e2M SI.

In September 2007, an Inventory Project Report (INPR) was developed for the USACE-Fort Worth District by the USACE-St. Louis District. The purpose of the INPR was to determine if any property associated with Former Maneuver Area MR site, that was no longer under the control of DoD, was eligible for inclusion in the FUDS MMRP. The INPR identified two non-contiguous, FUDS eligible parcels within the historical Former Maneuver Area MR site properties being addressed as a single FUDS property (FUDS Property Number K06TX1386). The 2007 INPR contained an FDE that indicated that, based on the Findings of Fact presented in the INPR, the property was determined to have been under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States prior to October 17, 1986. This property was therefore eligible for inclusion into the DERP-FUDS. The INPR identified an additional parcel of land potentially eligible for FUDS; however, the INPR did not contain any additional information regarding this additional parcel. Following the completion of the INPR, the FUDS program identified a discrepancy between the FUDS eligible property identified in the INPR and the MR site boundary. Because the Munitions Response site (MRS) included land that was not FUDS eligible, the entire site was not accepted into the FUDS MMRP. Therefore, to facilitate the evaluation of this MRS in a timely manner, the Army decided to perform the SI under the Active Army MMRP and postpone the determination of FUDS vs. Active Army eligibility until after the SI was completed. Based on the available historical records, it appears that the majority of the property associated with the Former Maneuver Area MR site was relinquished from use by the Army by 1980. The only exception is a 1,920-acre tract of land (Block 79, Township 2,

Sections 15, 16, and 21) that was under lease from the State of Texas from 1978 through 1987. Therefore, because the majority of the site was not under control or being used by the Army as of the October 1986, this area is eligible for the FUDS MMRP. However, the tract of land that was leased from the State until the end of 1987 is not eligible for the FUDS MMRP. These areas are depicted on Figure 3-3.

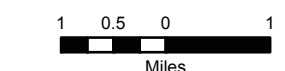
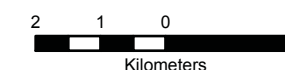
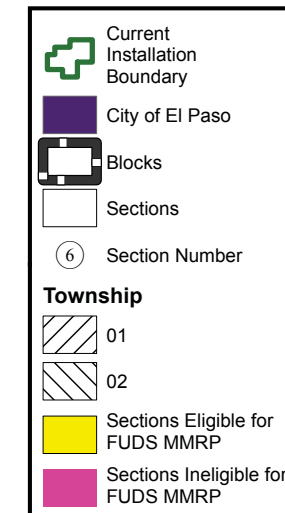
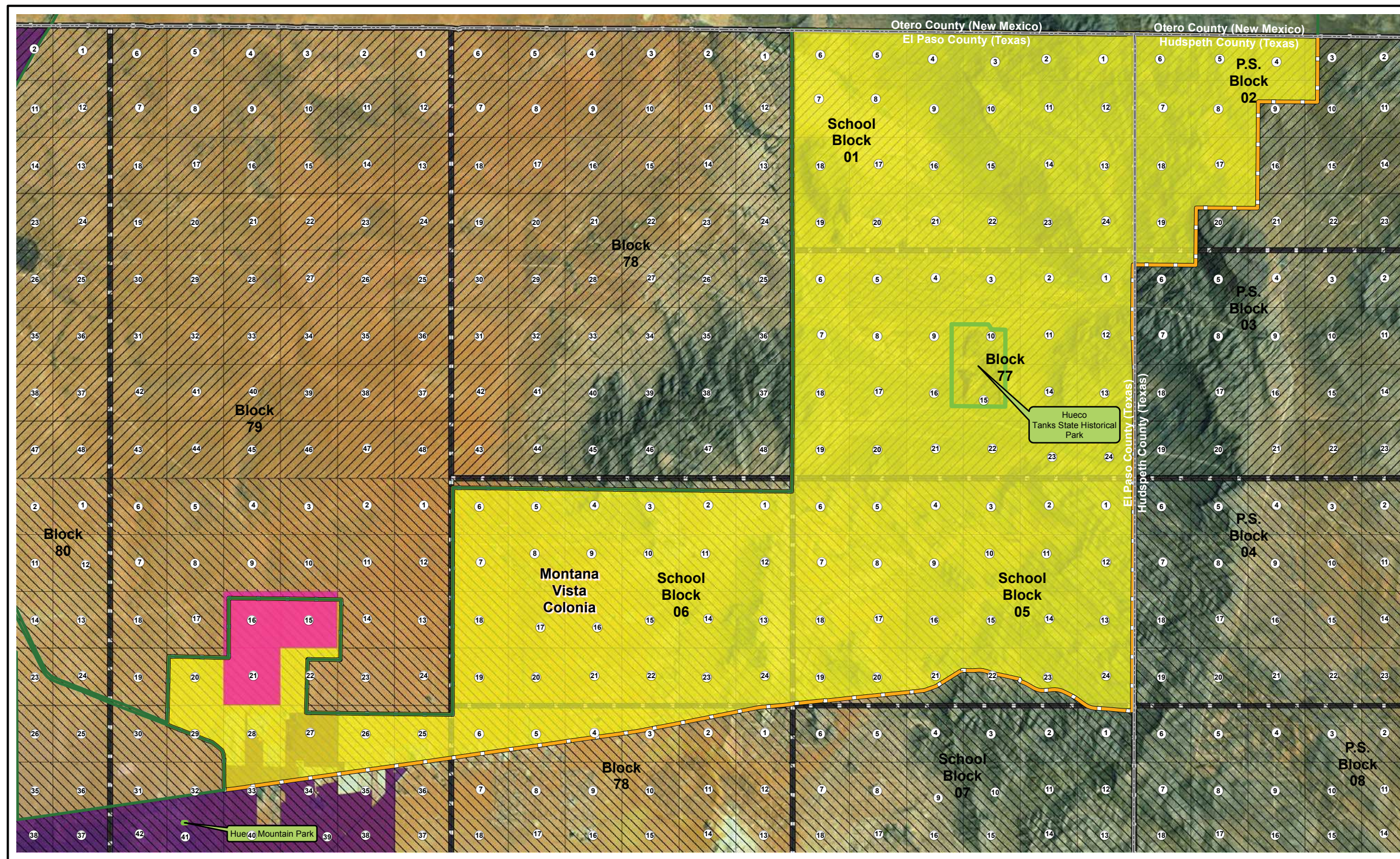
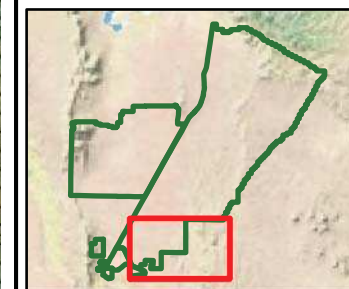


Site Inspection Fort Bliss, TX



Figure 3-3

FUDS MMRP Eligibility



Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008

Edition: Final Report

Date: March 2011

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Section 4

4.0 SITE INSPECTION TASKS

The following subsections provide a brief summary of the tasks that were completed under the SI at the Former Maneuver Area MR site associated with Fort Bliss. The results of the work performed at the site are summarized in Section 5.0 of this report. The SI field activities were conducted from October 4 through October 8, 2010. SI field activities included visual surveys and the collection of surface soil samples. Three Technical Planning Process (TPP) meetings were held in support of the SI; one kick-off meeting and two planning meetings. The meeting notes from the two planning meetings are included in Appendix G. In addition, two public meetings were held to provide landowners within the MRS information regarding the SI project. A summary of each of these meetings is included in Appendix H.

The field activities were performed by TLI personnel and all work was conducted in accordance with the May 2010 Final Work Plan. However, adjustments to transects and sample locations were made in the field based on visual observations and findings, accessibility to areas within the site, and field conditions, such as unsafe terrain and obstructions. No significant safety or Quality Assurance (QA) or Quality Control (QC) issues were encountered during the course of the SI.

DATA QUALITY OBJECTIVES

All Data Quality Objectives (DQOs) for this project as outlined in the May 2010 Final Work Plan have been met. The DQOs for this SI were developed in accordance with USACE guidance for developing DQOs as presented in the engineering manual (EM) *Technical Project Planning (TPP) Process*, EM-200-1-2, August 1998.

As indicated in Section 4.0 of the Generic Work Plan (Appendix F of the May 2010 Final Work Plan), the purpose of the site-specific investigation is not to fully characterize the nature and extent of all MEC and MC contamination. Therefore, the DQO thresholds for this project were lower than for an RI/FS project.

The generic DQO for this project was to collect an appropriate amount of data at the site to determine if the primary and secondary Project Objectives, defined in Section 3.0 of the Work Plan, have been met. In order to provide the information necessary to determine if the project objectives were obtained, the following site-specific DQOs were implemented.

Data Quality Objectives for Munitions and Explosives of Concern

The Former Maneuver Area MR site was evaluated to determine if it was impacted by the use, storage, or disposal of military munitions resulting in the potential for contamination by MEC.

- Visual surveys were conducted to determine the presence of MEC at the site. An appropriate portion of the site was covered by the survey in a meandering path to determine the presence of MEC with an emphasis on known areas of interest, such as firing points, target areas, areas where maneuvers were suspected to have been conducted, and previously identified MEC. The line miles of visual survey for the site are listed in Table 4-1 of this SI Report.
- If MEC was identified at the site as a result of SI field activities, the whole site or the affected portion of the site would be recommended for further investigation of MEC.
- If no evidence of MEC was observed on the surface, but subsurface anomalies were identified in an area where historical or visual evidence reflects military use of munitions, this would also warrant a recommendation for further investigation.

Data Quality Objectives for Munitions Constituents

The Former Maneuver Area MR site at Fort Bliss was evaluated to determine if it was impacted by the use, storage, or disposal of military munitions resulting in the potential for contamination by MC.

- Surface soil samples were collected from the site to evaluate for the presence of MC.
- Collection of surface soil samples were biased based on the presence of military munitions or the location of known areas of interest, such as firing points, target areas, detonation areas, areas where maneuvers are suspected to have taken place, and disposal areas.
- Samples were collected based on the criteria and procedures outlined in Section 3.2 of the Field Sampling Plan (FSP) in Appendix A of the Final Work Plan.
- Samples were analyzed for analytes defined in Tables 3-2 and 3-3 of the FSP in Appendix A of the Final Work Plan. The number of samples collected from each area is listed in Table 4-2 of this SI Report.
- The presence of any exceedance of the screening criteria identified in Section 3 and as defined in Tables 3-2 and 3-3 of the FSP in Appendix A of the Final Work Plan would warrant a recommendation for further investigation of MC at the site.
- Any detection of explosives will be evaluated to determine the need for further investigation of the site.

4.1 VISUAL SURVEY

Visual surveys were conducted at the Former Maneuver Area MR site to delineate site features and to identify MEC, MD, or munitions-related materials. The May 2010 Final Work Plan identified 16 investigative areas where visual surveys were to be conducted (Figure 4-1). Prior to the field work, USACE-Sacramento requested Rights of Entry (ROEs) to all parcels within each of the 16 areas. Only a limited number of ROEs were approved by the property owners. A summary of the ROE information is included in Appendix I.

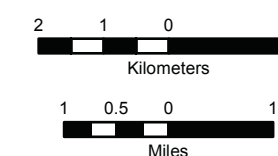
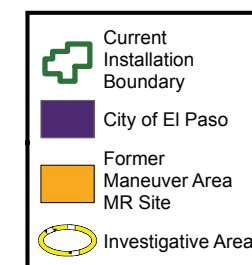
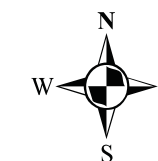
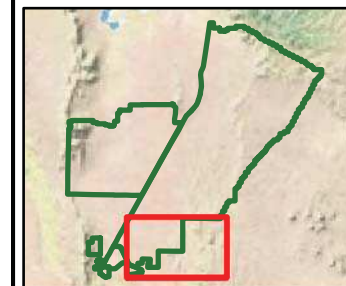


Site Inspection Fort Bliss, TX



Figure 4-1

Investigation Areas
Former Maneuver Area
MR Site



Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008

Edition: Final Report

Date: March 2011

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During the SI field activities, the field teams were able to complete transects within twelve of the survey areas located within the MR site boundary. A total of approximately 132.5 line miles were completed at the Former Maneuver Area MR site as depicted on Figure 5-1 in Section 5 of this report. Table 4-1 delineates the number of line miles completed. Details regarding the field team's effort to access the 16 areas are included in Section 5.1, below.

Table 4-1: Completed Visual Surveys

MRS	Survey Date	Total Line Miles
Former Maneuver Area MR Site – Area 1	Not accessible	-
Former Maneuver Area MR Site – Area 2	October 7, 2010	8.66
Former Maneuver Area MR Site – Area 3	Not accessible	-
Former Maneuver Area MR Site – Area 4	October 7, 2010	8.70
Former Maneuver Area MR Site – Area 5	October 5 – 6, 2010	12.68
Former Maneuver Area MR Site – Area 6	October 6, 2010	10.48
Former Maneuver Area MR Site – Area 7	October 5, 2010	22.47
Former Maneuver Area MR Site – Area 8	October 8, 2010	9.74
Former Maneuver Area MR Site – Area 8a	Not accessible	-
Former Maneuver Area MR Site – Area 9	October 4, 2010	24.08
Former Maneuver Area MR Site – Area 10	October 4, 2010	4.01
Former Maneuver Area MR Site – Area 11	October 5, 2010	11.98
Former Maneuver Area MR Site – Area 12	Not accessible	-
Former Maneuver Area MR Site – Area 13	October 7, 2010	8.82
Former Maneuver Area MR Site – Area 14	October 8, 2010	9.21
Former Maneuver Area MR Site – Area 15	October 6, 2010	1.68
Total Line Miles		132.51

During the visual survey, each team member walked individual transects, nominally spaced at approximately 30-foot intervals (based on terrain, ground cover, and vegetation). Points of interest, including, terrain, vegetation, and other MR site features (i.e. topography, fencing, etc.), dictated the actual survey transects taken by each team member. All munitions-related items or other evidence of military use observed along the transects were identified, recorded, and located using handheld global positioning system (GPS) units. GPS units accurate to within 5 to 10 meters, depending on the satellite coverage available throughout the day, were used to record the track of each individual transect. Field personnel were also equipped with hand-held electromagnetic metal detectors to aid in their search for munitions and related debris on the ground surface. Groundcover such as leaves, deadfall, grass, or weeds, was removed as necessary to expose the ground surface in order to determine if metal detector anomaly sources could be identified. However, no intrusive investigation of subsurface anomalies was pursued (i.e., no soil was removed to investigate anomaly sources). Results of the visual surveys are presented in Section 5.1.1 of this report.

Maps of individual survey areas within the MR site were provided to each survey team member to record all relevant finds, relative anomaly density of an area, and/or identify potential soil sample locations. The maps allowed the survey team to track their location through the identification of terrain features such as roads, drainages, hillsides/slopes, or

other recognizable topographic or cultural features. Additionally, each GPS unit was uploaded with map coordinates for each visual survey area. This allowed team members to identify visual survey area boundaries and to navigate to specific points or areas. The GPS units also allowed team members to track their locations using known GPS coordinates.

Photographs were taken of all munitions-related items and the other points of interest. They were then downloaded, correlated with the field map, and archived. Section 5.0 includes a series of photographs that are representative of the munitions-related evidence and other points of interest identified during the field surveys. Additional site photographs are presented in Appendix C of this report. Each member of the field team maintained a field log documenting all relevant items observed and any issues encountered during the visual survey. A copy of the field logs, as well as the daily field reports submitted by the field team to the USACE Project Manager, are provided in Appendix D of this report.

4.2 SAMPLING ACTIVITIES

The primary purpose of collecting surface soil composite samples and incremental samples (IS) at the Former Maneuver Area MR site at Fort Bliss was to assess a possible worst-case situation by focusing sampling on areas that were most likely to have MC contamination due to past uses of military munitions. The planned sampling was intended to determine if further investigation at the MR site is warranted and utilized a dynamic approach to selecting locations for sampling. Potential sample locations were evaluated in the field to determine if any potential releases may have occurred at the site. If there was no evidence of a potential release, the field team selected a location for sampling that generally represented the overall characteristics of the investigation area. Figure 5-1 depicts the locations of the individual soil samples collected at the MR site.

Both surface soil composite samples and IS were collected during the field investigation. Samples were taken only after a UXO Technician had determined that the area contained no surface MEC items or sub-surface anomalies that could present a hazard during the sampling activities. Field notes documented all areas selected for sampling locations, the rationale for selecting the location, and a determination of whether the MR site was safe for sampling. Soil sampling locations were chosen based on review of the visual survey data, such as evidence of MD or other military activities. Specific information on soil sample locations and results are provided in Section 5.0, along with photographs of sampling activities. Table 4-2 summarizes the samples collected.

Table 4-2: Soil Samples Collected

MRS	Sample Collection Date	Number of Samples				
		Incremental		Surface Soil		Total
		Field Samples	Field Duplicates	Field Samples	Field Duplicates	
Former Maneuver Area MR Site – Area 1	Not accessible	-	-	-	-	-
Former Maneuver Area MR Site – Area 2	October 7, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 3	Not accessible	-	-	-	-	-
Former Maneuver Area MR Site – Area 4	October 7, 2010	0	0	2	1	3
Former Maneuver Area MR Site – Area 5	October 6, 2010	3	0	0	0	3
Former Maneuver Area MR Site – Area 6	October 6, 2010	3	0	0	0	3
Former Maneuver Area MR Site – Area 7	October 5, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 8	October 8, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 8a	Not accessible	-	-	-	-	-
Former Maneuver Area MR Site – Area 9	October 4, 2010	1	1	0	0	2
Former Maneuver Area MR Site – Area 10	October 4, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 11	October 5, 2010	1	0	1	0	2
Former Maneuver Area MR Site – Area 12	Not accessible	-	-	-	-	-
Former Maneuver Area MR Site – Area 13	October 7, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 14	October 8, 2010	1	0	0	0	1
Former Maneuver Area MR Site – Area 15	October 6, 2010	1	0	0	0	1
Total Sampling Activities Conducted		15	1	3	1	20

Composite surface soil samples and IS samples were collected in conformance with the U.S. Army Corps of Engineers EM 200-1-3 and Interim Guidance 09-02. Soil samples were collected, handled, and analyzed in accordance with the protocols defined in the Field Sampling Plan in the May 2010 Final Work Plan.

Composite surface soil samples were taken at locations in proximity to significant MD finds. These sample were collected using a spoke and hub layout (radial perimeter method), centered on the suspected impacted soils. The sample was a composite of seven discrete locations within the area of the designated sampling location. The six perimeter samples were collected along a radius of 0.5 meters from the center sample. Soil collected for each individual sample was thoroughly homogenized (mixed) prior to placing them in a sterile sampling container and sent to an analytical laboratory for analysis.

IS were collected from areas in which MD was scattered over a wide area or where no evidence of military munitions was observed. After the location of the sampling unit was determined, a corner was marked with a flag and a GPS waypoint was collected. Using the GPS unit to determine how far apart the corners should be (based on the size of the sampling unit), the next corner was flagged and a GPS waypoint was collected at the appropriate distance. All corners were flagged and had a GPS waypoint collected in this manner. Flags were placed at the beginning and end of each row, spaced appropriately as the size of the sampling unit dictated, to aid the field team visually in collecting the increments from the appropriate locations. The field team then began at a corner and wove back and forth across the sampling unit, with a UXO technician sweeping each increment location, collecting increments at equally spaced intervals, as dictated by the size of the sampling unit. A duplicate and a triplicate sample were collected from two of the sampling units, Areas 5 and 6. The duplicate and triplicate increment locations were selected in the field by stepping out from the original location approximately two feet in two different directions. These increments were collected using an incremental sampling tool over areas ranging from one-half acre to one acre with the number of increments ranging from 30 to 50 per sampling unit. Approximately one kilogram (kg) of soil was collected for each sample. This sealable plastic bag was placed in another sealable plastic bag to better protect the sample. Details on sampling methods used for each location are described in Section 5.0.

Soil samples collected during field activities were analyzed by TestAmerica Laboratories, Inc. in Arvada, Colorado, a National Environmental Laboratory Accreditation Program (NELAP) and DoD Environmental Laboratory Accreditation Program (ELAP) certified laboratory. Quality control samples were collected in the field and also sent to TestAmerica for analysis.

Surface soil and IS were analyzed for a subset of the Target Analyte List (TAL) metals by Method Solid Waste (SW) 6010. The stakeholders agreed to an abbreviated list of metals at the October 15, 2009 Technical Project Planning meeting. Metals were selected for analysis based on metals that were known to be associated with the munitions used at

the areas associated with the Former Maneuver Area MR site. The analysis for metals included antimony, barium, copper, lead, magnesium, potassium, and zinc. Metals were assessed in comparison to the TCEQ state background levels multiplied by a factor of three. The TCEQ state background levels for the metal analytes to be tested for are presented in Table 4-3.

Table 4-3: Project Analyte List for Metals and TCEQ State Background Levels for Soil Samples^(a)

Analyte	TCEQ State Median Background Levels (mg/kg)	3 x TCEQ State Background Levels (mg/kg)
Metals (Preparation: SW 3050B; Analysis: SW 6010) (mg/kg)		
Antimony	30,000	90,000
Barium	300	900
Copper	15	45
Lead	15	45
Magnesium	NA	NA
Potassium	NA	NA
Zinc	30	90

Notes:

(a) TCEQ State Background Levels (March 2007) have been used.

mg/kg = milligrams per kilogram

SW = Test Method Solid waste (EPA 1997)

NA = Not Applicable

The analysis also included Target Compound List (TCL) explosives by Method SW8330. In general, the Active Army MMRP SI process compares the soil sampling results for explosives to the U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs). However, for the Former Maneuver Area MR site, any detection of explosives will be evaluated to determine the need for further investigation of the site. The RSLs for the explosive analytes to be tested for are presented in Table 4-4. The results of the sampling activities are presented in Section 5.0 of this report.

Table 4-4: Project Analyte List for Explosives and USEPA Regional Screening Levels for Soil Samples^(a)

Analyte	Residential (mg/kg)
Explosives: Nitroaromatics and Nitramines (Extraction & Analysis: SW8330)	
1,3-Dinitrobenzene	6.1
1,3,5-Trinitrobenzene (sym-TNB)	2,200
2,4,6-Trinitrotoluene (TNT)	19
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	150
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	150
2,4-Dinitrotoluene	1.6
2,6-Dinitrotoluene	61
2-Nitrotoluene (o-Nitrotoluene)	2.9
3-Nitrotoluene (m-Nitrotoluene)	1,200
4-Nitrotoluene (p-Nitrotoluene)	30

Table 4-4: Project Analyte List for Explosives and USEPA Regional Screening Levels for Soil Samples^(a) (concluded)

Analyte	Residential (mg/kg)
Explosives: Nitroaromatics and Nitramines (Extraction & Analysis: SW8330)	
Octogen (HMX)	3,800
Nitrobenzene	4.4
Cyclotrimethylene trinitramine (RDX)	5.5
Tetryl	240
Nitroglycerin (NG)	6.1
Pentaerythritol tetranitrate (PETN)	NA

Notes:

(a) U.S. EPA Regional Screening Levels (April 2009) have been used

mg/kg = milligrams per kilogram

SW = Test Method Solid Waste (EPA 1997)

In general, any contaminant of concern that exceeds the screening criteria will prompt the initiation of further studies at the site. Not all metals or explosives compounds have RSLs. If contaminants are present at the MR site below the levels presented in the RSL table, they are generally considered not to present a risk. However, RSLs are designed to be used as a guide in an investigation and do not necessarily mean that a particular contaminant or suite of contaminants do or do not present a risk to the environment. Analytical results for each sample are presented in Table 5-4 at the end of Section 5.0.

Section 5

5.0 SITE INSPECTION FINDINGS

The following subsections provide the results of the SI field work conducted at the Former Maneuver Area MR site, Fort Bliss from October 4 through 8, 2010. A brief summary of the tasks conducted during the field activities has been provided in the previous section (Section 4.0) of this report. Photographs of the field activities are included in Appendix C of this report. In addition, copies of field logs and daily field reports are included in Appendix D.

Level IV data validation was conducted for 10% of the samples collected for the Former Maneuver Area MR site. The remaining analytical data underwent Level III data validation. The validation qualifiers (VQs) and a summary of all analytical results are provided in Table 5-4 located at the end of Section 5.0. Complete analytical data reports are provided in Appendix A and detailed data validation reports are provided in Appendix B of this report. Based on the data validation that was conducted and the information provided by the laboratory, the data was determined to be acceptable with minor qualifications noted in the tables and validation reports.

5.1 FORMER MANEUVER AREA MR SITE

Activities conducted at the Former Maneuver Area MR site included a visual survey and surface soil composite sampling and incremental sampling. The results of these activities are presented below.

5.1.1 Visual Survey Results

This 72,520.82 acres site is located east of the Fort Bliss cantonment area, adjacent to the southeastern installation boundary of Fort Bliss. The majority of the site is undeveloped and consists of land used for cattle ranching, recreational purposes (i.e., hunting, camping, hiking, rock climbing, and ecological, cultural, and historic resources), education, and wildlife preserve (Hueco Tanks State Park and Historic Site). The Former Maneuver Area is also used for residential housing, gravel mining operations at two quarries, a large tank farm, and some light industry and commercial areas. The field team observed signs of use by ranchers and recreational users (trash, roads, and fences); however, it was evident that the majority of the site is minimally accessed by the public.

The site topography varies from generally flat to steep, hilly terrain. The Hueco Mountains area located in the eastern portion of the Former Maneuver Area MR site with Hueco Tanks being located west of the Hueco Mountains. Elevation at the site ranges from 3,900 feet to 6,000 feet above mean sea level (msl).

Vegetation at the site consisted mainly of a low-growing, sparse shrub layer, agave, various cacti, mesquite, and grasses. The areas containing low, sparse vegetation allowed the team members to walk 30 or more feet apart, enabling each team member to survey approximately 15 to 20 feet of surface area to either side. In areas where the vegetation changed density and height visibility was reduced the team spacing narrowed.

It was determined prior to the start of field activities that visual surveys would be conducted within 16 investigative areas within the site. These areas were generally selected based on historical information, anticipated accessibility, and proximity to populated areas. The stakeholders agreed to this approach during the October 2009 TPP meeting.

Approximately 132.5 line miles of visual surveys were conducted at 12 of the 16 areas (Areas 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, and 15) using a meandering path approach within the Former Maneuver Area MR site (Figure 5-1). In some areas, visual survey was conducted outside the area originally planned. This occurred when an area had access issues, such as Area 11 where only a portion of the planned area had executed Rights-of-Entry (ROE), and the field team meandered outside the planned boundary of the investigative area, but within the properties for which ROEs were obtained, in an attempt to collect more data. This also occurred when the field team was accessing a planned area, as in Area 10. Area 15 was an incremental sampling unit only and the location and parameters were selected based on field conditions and in proximity to a previous detonation location. ROEs were in place for all areas the field team accessed outside of the planned investigative areas. The field team was unable to access the remaining four Investigative Areas (1, 3, 8a, and 12) due to road conditions or locked gates as shown on Figure 5-2 and described below. The field team discussed the access issues with the Fort Bliss point of contact and documented the information in the Daily Field Reports.

- Area 1 – The field team attempted access via two routes. One dirt track ended within Area 2. The other dirt track ended at a washout. The field team did not attempt to hike to the area because the distance was too far and they could not determine if they were on state owned or privately-owned land for which they did not have an ROE.
- Area 3 – TLI attempted to access this area via a dirt track along the fence that borders state-owned land. Within about ½ mile of the gate, the track became impassable where it washed out. The field team did not attempt to hike to the area because the distance was too far and they could not determine if they were on state owned or privately-owned land for which they did not have an ROE.
- Area 8a – Area 8a was inaccessible due to a locked gate. TLI did not know who owned the property; therefore, the field team was unable to contact the property owner to request access.
- Area 12 – Although the Old Butterfield Trail is supposed to allow for public access across the area, a locked gate prevented access from the north (near Area 11). (b) (6) provided the field team with the name of the property owner; however, the gate was actually put in by ranchers leasing the land. TLI attempted to contact the property owner, but there was no answer. The field team also attempted to access this area from Hwy 62. Another locked gate is located there. The field team made several attempts (and spent over 2 hours) trying to find access to the investigative area from the west. TLI spoke with residents in the

area and they indicated to the field team where the best access was; however, the dirt track that was located along the fence denoting the southern installation boundary of Fort Bliss was washed out within about ½ mile of accessing it from the neighborhood to the west.

Figure 5-1 depicts the sixteen areas as well as the visual survey transects, sample locations and locations of MD. Figure 5-2 depicts areas that could not be accessed due to road conditions, locked gates, and fencing. Figures 5-3 through 5-9 depict the visual survey transects, sample locations, and locations of the MD for the areas where there was evidence of military activity. Figures 5-10 through 5-14 depict the visual survey transects and sample locations for the areas where there was no evidence of military activity. Due to the number of figures required to effectively depict the results of the SI field work, all figures are located at the end of this section.

Although no MEC items were observed during the visual survey, MD was identified in Investigative Area 4 as shown on Figure 5-1 and summarized below. In addition, small arms debris and evidence of military activity was observed in Areas 5, 6, 9, 10, 11, and 14.

An apparent impact area with 4.2-inch mortar shells was observed in Investigative Area 4 in the northwestern portion of the site (Photographs 5-1 to 5-4). Locations where MD was observed are depicted on Figure 5-3. Based on the number of fragments observed in the area, it is presumed that this location was the impact area for mortar training activities. The field team evaluated the surrounding area; however, they were not able to determine the most likely location for the firing line. Based on the type of fragments observed, it is possible the mortars contained white phosphorus, which would have been commonly used for spotting during mortar training activities. The nomenclature observed on the 4.2-inch mortar shell fragments was as follows: “X Shell M2A... Fuze M2-xx-Lot P-236-1 and CH.M.Shell M2 P255-22-HYDRIL-R”. In addition, based on an analysis of the fragments by the UXO technicians participating in the field activities, it appears that some of the fragments were created by the anticipated function of the mortars upon impact. However, the shearing of some of the fragments indicated that they were created by an external detonation. This may indicate that a UXO clearance was previously conducted in this area and that UXO may have been disposed by an explosive charge.



**Photograph 5-1: Obturator/rotating band from
4.2-inch mortar shell (October 7, 2010)**



**Photograph 5-2: Rotating band and fragments from
4.2-inch mortar shell(s) (October 7, 2010)**



Photograph 5-3: Several fragments from multiple 4.2-inch mortar shells (October 7, 2010)



Photograph 5-4: Fuze from 4.2-inch mortar shell (October 7, 2010)

Investigative Area 10 (Figure 5-4) appeared to have had a firing position located on top of a hill with the crest approximately 20 feet above the surrounding area. The field team identified a machine gun link pile with an estimated 50 links, approximately one dozen blank shell casings (Photograph 5-5), various clips, a starter tab, and an illuminating flare canister lid.



Photograph 5-5: .30 Caliber blank shell casing (October 4, 2010)

Investigative Area 11 (Figure 5-5) appeared to have been used as a fighting position. The field team observed multiple locations of small amounts of small arms MD. It appeared as though troops were engaged in mock skirmishes where a few rounds were fired and then the troops moved on to another location. The field team identified a large pile of machine gun links (approximately 500) as shown in Photograph 5-6, various caliber blank shell casings, additional machine gun links, Communication wire, M1 Garand clips, and 3 belt starter tabs in various locations throughout the visual survey area. A live 1943 .30-06 complete ball cartridge was also identified in Area 11 (Photograph 5-7).



Photograph 5-6: Browning machine gun link pile (~500 links) and 3 belt starter tabs (October 5, 2010)



Photograph 5-7: 1943 .30-06 complete ball cartridge (October 5, 2010)

Investigative Area 14 (Figure 5-6) appeared to have been a bivouac area. The field team identified tent stakes, chemical lights, a grounding rod for a generator, communication wire, and a 5.56 mm blank shell casing.

At Investigative Areas 5, 6, and 9 (Figures 5-7, 5-8, and 5-9, respectively), the field team identified blank shell casings, the fuze body from a smoke grenade (Photograph 5-8), '03 Springfield stripper clips, and a Winchester Repeating Arms Co. .30 caliber shell casing from the late 1800s.

Based on the dates stamped on the munitions debris and the knowledge of the UXO technicians, the dates of military use of the Former Maneuver Area MR site range from the late 1800s to the mid to late 1970s. The chemical lights observed in Investigative Area 14 (Figure 5-6) date into the 1970s as does the expended smoke grenade.



Photograph 5-8: Top from an expended smoke grenade (October 5, 2010)

During the visual survey in Area 6, (b) (6) indicated that the dam located on the western side of Hueco Tanks was created by scraping soil from within the central area between the north, eastern, and southern mountains into a mound. The dam was created in the early 1960s; therefore, any munitions items that would have been located on the surface of the central area would probably be now buried in the dam. Therefore, the field team focused the survey of the area long the extent of the dam. (b) (6) also stated that paths were cut into the north and south ends of the dam to allow access into the central area. During this operation, the soils were screened to search for artifacts. No munitions items were found during this screening activity.

Following completion of the visual survey in Areas 5 and 6, the field team visited the Hueco Tanks State Park and Historic Site visitor's center to see other munitions items that had been found within the historic site. According to (b) (6), Superintendent, all munitions items contained within a display case in the visitor's center were found by park personnel and visitors. The munitions items identified within Hueco Tanks include a signal flare from the 1960s or 1970s and a .45-70 Government Cartridge from the mid to late 19th century. Based on observations made by the UXO technicians on the field team, it was determined that the munitions items held within the glass case in the visitor's center no longer contained any explosive hazards. However, the UXO technicians did not actually handle any of the items.

No MD or evidence of military activity was identified within Investigative Areas 2, 7, 8, 13, or 15 (Figures 5-10 – 5-14).

Table 5-1 provides a summary of the MD and other evidence of military activity in these areas.

Table 5-1: Summary of Finds

Investigative Area	Find(s)
Area 4	HE detonation fragment
	Fragments and fuzes from 4.2-inch mortar shell
Area 5	.30-06 blank shell casings from 1934, 1943, and 1945
	Top from a (possible M18) expended smoke grenade
	'03 Springfield Stripper Clips
Area 6	W.R.A. Co. .30 caliber shell casing (late 1800s)
Area 9	'03 Springfield Stripper Clip
Area 10	M104 illuminating flare canister lid
	.30-06 blank shell casings from 1943-1944 and 1951-1952
	Machine gun links
	Starter tab from .30 caliber Browning machine gun belt
	M14 Rifle Clip
	M1 Garand Clip

Table 5-1: Summary of Finds (concluded)

Investigative Area	Find(s)
Area 11	.30-06 blank shell casings from 1948 and 1954
	Communication wire
	M1 Garand clips
	.30 caliber Browning machine gun link
	Browning machine gun link pile (~ 500 links)
	3 belt starter tabs
	1943 .30-06 complete ball cartridge
	M60 link
	5.56 mm blank shell casing from 1972
	7.62 mm blank shell casing from 1974
Area 14	Military tent stake
	Chemical Lights
	Communication Wire
	Grounding rod for a generator
	5.56 mm blank shell casing from 1965

Following the completion of the field investigation, TLI contacted CEMEX and JOBE Materials LP as they have quarry operations within the Former Maneuver Area (b) (6) (b) (6) (b) (6), Production Manager, CEMEX and (b) (6) (b) (6) (b) (6) were contacted by phone. Both stated that no munitions had been reported as being found at the quarries.

5.1.2 Analytical Results

Surface soil composite samples and IS were collected at various locations within the twelve surveyed areas. Photographs 5-9 and 5-10 provide examples of the composite sampling and incremental sampling, respectively. Photographs of all sample locations are provided in Appendix C of this report. A total of 18 primary samples and two QC samples were collected for analysis.

The samples included:

- 3 surface soil composite samples (FTBLS-SS001 through FTBLS-SS003).

- 15 IS (FTBLS-IS001 through FTBLS-IS011 and FTBLS-IS013 through FTBLS-IS016). Within the 15 IS, two sets of duplicate/triplicate samples were collected; one set from Area 5 (FTBLS-IS009 through FTBLS-IS011) and the other from Area 6 (FTBLS-IS005 through FTBLS-IS007). The duplicate/triplicate samples were collected at a rate of 10% to assess the precision of the sampling method.
- Two QC (duplicate) samples (FTBL-SS004 and FTBLS-IS012).

A minimum of one sample was collected from each visual survey area. If a specific MD item and its impact area were observed during the visual survey, a composite (spoke and hub) soil sample was collected at the location within the impact area. If no evidence of MEC, MD, or military activity was observed, IS were collected. If small arms debris was scattered over a large area, IS were collected. IS with 40 increments were collected from 0.5 acre sampling units identified in Areas 2, 5, 7, 8, 10, 11, and 14. One acre sampling units with 50 increments were collected from Investigative Areas 6 and 9. A 0.75 acre sampling unit with 40 increments was collected from Investigative Area 15 within an area encompassing a previous MEC find and detonation performed in December 2009 by the El Paso Police Bomb Squad.

All samples were collected from within 6 inches of the surface; no intrusive sampling was conducted. The rationale used for selecting each sample location is provided in Table 5-2.



Photograph 5-9: Composite soil sample FTBLS-SS002 (October 7, 2010)



Photograph 5-10: Field team collecting soil and waypoint for a sample increment (October 6, 2010)

Table 5-2: Former Maneuver Area Locations and Rationale for Soil and Incremental Samples

Sample Name	Sample Location Decimal Degrees		Random or Biased	Rationale
	Latitude	Longitude		
FTBLS-SS001	31.90	-106.09	Biased	Down gradient from large collection of MD in Area 11.
FTBLS-SS002	31.95	-106.07	Biased	In proximity to 4.2-inch mortar shell impact area in Area 4.
FTBLS-SS003	31.95	-106.08	Biased	In proximity to fragmentation from 4.2-inch mortar shells in Area 4.
FTBLS-SS004	31.95	-106.08	Biased	QC sample for FTBLS-SS003.
FTBLS-IS001	31.85	-106.09	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 9.
FTBLS-IS002	31.85	-106.09	Biased	Sampling unit centered on firing position within Area 10.
FTBLS-IS003	31.87	-106.08	Biased	Small arms debris was scattered over a large area in Area 11.
FTBLS-IS004	31.90	-106.09	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 7.
FTBLS-IS005	31.89	-106.04	Biased	In proximity to an area historically used for anti-aircraft gun emplacement in Hueco Tanks State Park and Historic Site (Area 6).
FTBLS-IS006	31.92	-106.05	Biased	Duplicate of FTBLS-IS005.

Table 5-2: Former Maneuver Area Locations and Rationale for Soil and Incremental Samples (concluded)

Sample Name	Sample Location Decimal Degrees		Random or Biased	Rationale
FTBLS-IS007	31.92	-106.05	Biased	Triplicate of FTBLS-IS005.
FTBLS-IS008	31.92	-106.05	Biased	Sampling unit in Area 15 encompassing a previous MEC find and detonation.
FTBLS-IS009	31.87	-106.03	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 5.
FTBLS-IS010	31.93	-106.04	Random	Duplicate of FTBLS-IS009.
FTBLS-IS011	31.93	-106.04	Random	Triplicate of FTBLS-IS009.
FTBLS-IS012	31.93	-106.04	Random	QC sample for FTBLS-IS001.
FTBLS-IS013	31.98	-106.06	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 2.
FTBLS-IS014	31.88	-106.14	Random	Sampling unit location randomly chosen in proximity to residences in Area 13.
FTBLS-IS015	31.90	-106.01	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 8.
FTBLS-IS016	31.83	-106.25	Random	No evidence of MEC, MD, or military activity was observed; therefore, a sampling unit location was randomly chosen within Area 14.

Analytical results for metals indicate that all soil sample concentrations are below the applicable screening criteria and no explosives were detected in any of the samples. All copper and lead results were flagged “Q” by the laboratory to indicate that one or more quality control criteria failed. The laboratory indicated that copper and lead were detected in the Interference Check Sample (ICS) at concentrations greater than the limit of detection. These analytes are believed to be present in the ICS solution and no interference is noted. The results are acceptable and no data validation qualifiers were added. No data were rejected, resulting in 100% usability for both the metals and the explosives results. Analytical results are summarized in Table 5-4.

A triplicate and a duplicate sample were collected from Investigative Areas 5 and 6 in addition to the original sample to evaluate the precision of the sampling. Essentially, Area 5 and Area 6 were sampled three times each utilizing different increment locations. The results of these three samples were used to calculate precision as relative standard deviation (RSD) using the formula: $RSD = (100 * \text{standard deviation}) / (\text{average})$. The results of the RSD calculation are summarized in Table 5-3 below. If the total %RSD (total error) between three to five field replicates from the same sampling unit is less than 30%, then the sampling design and execution are likely to be adequate and the distribution of replicate results can be assumed to be approximately normal.

Table 5-3: RSD Results

Area 5		Area 6	
Analyte	RSD	Analyte	RSD
Barium	10.41%	Barium	1.14%
Copper	0.66%	Copper	4.56%
Lead	7.41%	Lead	0.00%
Magnesium	31.73%	Magnesium	3.36%
Potassium	24.05%	Potassium	2.34%
Zinc	1.71%	Zinc	3.33%

All RSDs, with the exception of magnesium for Area 5, are well below the requisite 30% indicating that the sampling method was adequate and the results are normal. The Area 5 magnesium result is only slightly above the 30% threshold and does not impact the fact that the results for all these samples are all well below the screening criteria.

Matrix spike/matrix spike duplicates (MS/MSD) analyses were performed by the laboratory. All MS/MSD results were within the QC limits with the exception of antimony. As a result of low recoveries, the non-detected results for antimony were qualified as estimated (UJ).

The laboratory flagged the post spike recovery for barium for sample FTBLS-IS014 as not meeting the QC limits. However, the parent sample concentration was greater than four times the spike value and no qualification was required.

The non-detected results for 2-amino-4,6-dinitrotoluene were qualified in six samples as estimated due to exceeded calibration criteria.

Two field duplicate samples were collected with these incremental samples to assess for both analytical and sampling precision. All field duplicates were acceptable.

Additional information regarding the data validation process is provided in Section 5.2 of this report.

5.2 CHEMICAL DATA QUALITY ASSESSMENT

The MC data were reviewed and validated by senior chemists at TLI. Data validation was conducted in accordance with the following documents: *Test Methods for Evaluating Solid Wastes* (2007); *USEPA Contracts Laboratory Program National Functional Guidelines for Evaluating Inorganic Data Review* (October 2004); and *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 3* (DoD QSM) (2009). The validation was performed for 100% of the samples.

Level IV data validation was conducted for 10% of the samples collected for the Former Maneuver Area MR site. The remaining analytical data underwent Level III data validation.

The data review included an evaluation of the following QC parameters:

- Data Completeness
- Holding Times and Preservation
- Calibrations
- Blank Analysis Results
- Surrogate Recoveries
- MS and MSD Results
- Triplicate Sample Analysis
- Duplicate Sample Analysis
- Field Duplicates
- Laboratory Control Samples
- Compound Identification (full validation only)
- Compound Quantitation and Reporting Limits (full validation only)
- Analytical Reporting Limits and Method Detection Limits
- Interference Check Sample Results
- Serial Dilution Results

All analytical data for the surface soil composite samples and IS was validated and deemed complete. Based on the data validation that was conducted and the information provided by the laboratory, the data was determined to be acceptable with minor qualifications noted in the tables and validation reports. All QC parameters were within the project acceptance limits. All of the results were considered usable for the intended purpose and the project DQOs have been met.

The complete data validation report is included in Appendix B.

Table 5-4: Former Maneuver Area Site Inspection Analytical Results Summary

			Sample ID			FTBLS-SS001			FTBLS-SS002			FTBLS-SS003			FTBLS-SS004			FTBLS-IS001			FTBLS-IS002			FTBLS-IS003			FTBLS-IS004		
			Sample Depth			Surface			Surface			Surface			Surface			Surface			Surface			Surface			Surface		
Analyte	3 X TCEQ State Median Background Levels (mg/kg) ⁽¹⁾	USEPA RSLs for Residential Soils (mg/kg) ⁽²⁾	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ			
Total Metals, mg/kg (SW6010C)																													
Antimony	90,000	31	0.54	U	UJ	0.59	U	UJ	0.51	UJ	UJ	0.56	U	UJ	0.55	U		0.55	U		0.59	U		0.58	U				
Barium	900	15,000	49			77			76			68			40		J	58		J	91		J	65		J			
Copper	45	3,100	9.9	Q		8.6	Q		6.4	Q		5.5	Q		5.2	Q		8.4	Q		7.8	Q		9.5	Q				
Lead	45	400	11	Q		9.3	Q		6.7	Q		6	Q		7.1	Q		11	Q		9.3	Q		8.6	Q				
Magnesium	NA	NA	2,200			3,000			2,900			2,600			1,600		J	5,000		J	2,900		J	2,800		J			
Potassium	NA	NA	1,500			1,800			2,000			1,700			1,600		J	2,400		J	2,000		J	2,100		J			
Zinc	90	23,000	23		J	30		J	29		J	27		J	19		J	30		J	39		J	27		J			
Explosives, mg/kg (SW8330B)																													
1,3,5-Trinitrobenzene	NA	2,200	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
1,3-Dinitrobenzene	NA	6.1	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
2,4,6-Trinitrotoluene	NA	19	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
2,4-Dinitrotoluene	NA	1.6	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
2,6-Dinitrotoluene	NA	61	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
2-Amino-4,6-dinitrotoluene	NA	150	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
2-Nitrotoluene	NA	2.9	0.077	U		0.078	U		0.078	U		0.077	U		0.078	U		0.078	U		0.075	U		0.075	U				
3-Nitrotoluene	NA	1,200	0.077	U		0.078	U		0.078	U		0.077	U		0.078	U		0.078	U		0.075	U		0.075	U				
4-Amino-2,6-dinitrotoluene	NA	150	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
4-Nitrotoluene	NA	30	0.096	U		0.097	U		0.097	U		0.096	U		0.098	U		0.098	U		0.093	U		0.094	U				
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	NA	5.5	0.077	U		0.078	U		0.078	U		0.077	U		0.078	U		0.078	U		0.075	U		0.075	U				
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NA	240	0.077	U		0.078	U		0.078	U		0.077	U		0.078	U		0.078	U		0.075	U		0.075	U				
Nitrobenzene	NA	4.4	0.077	U		0.078	U		0.078	U		0.077	U		0.078	U		0.078	U		0.075	U		0.075	U				
Nitroglycerin	NA	6.1	0.39	U		0.39	U		0.39	U		0.39	U		0.39	U		0.39	U		0.37	U		0.38	U				
Octahydro-tetranitro-1,3,5,7-tetrazocine (HMX)	NA	3,800	0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.039	U		0.037	U		0.038	U				
Pentaerythritol tetranitrate (PETN)	NA	NA	0.39	U		0.39	U		0.39	U		0.39	U		0.39	U		0.39	U		0.37	U		0.38	U				

Acronyms

FTBLS = Ft. Bliss
IS = Incremental Sample
mg/kg = milligrams per kilogram
RSL = Residential Screening Level
SS = Surface Sample
SW = Solid Waste
TCEQ = Texas Commission on Environmental Quality
USEPA = U.S. Environmental Protection Agency
LQ = Lab Qualifier and VQ = Validation Qualifer
J = Estimated Value--The analyte is positively identified but the reported concentration is an estimate due to QC failure or data quality limitations
M = Manual integrated compound
Q = One or more quality control criteria failed
U = The analyte was not detected above the reporting limit
UJ = Estimated value--The analyte is non-detected above the method detection limited (MDL) but the result is an estimate due to QC failure of data quality limitations

Notes

- (1) 3X TCEQ State Background Levels (March 2007) have been used.
(2) U.S. EPA Regional Screening Levels (April 2009) have been used
(3) Test Method SW (EPA 1997)

Table 5-4: Former Maneuver Area Site Inspection Analytical Results Summary

			Sample ID			FTBLS-IS005			FTBLS-IS006			FTBLS-IS007			FTBLS-IS008			FTBLS-IS009			FTBLS-IS010			FTBLS-IS011			FTBLS-IS012			FTBLS-IS013			FTBLS-IS014		
			Sample Depth			Surface			Surface			Surface			Surface			Surface			Surface			Surface			Surface			Surface			Surface		
Analyte	3 X TCEQ State Median Background Levels (mg/kg) ⁽¹⁾	USEPA RSLs for Residential Soils (mg/kg) ⁽²⁾	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ			
Total Metals, mg/kg (SW6010C)																																			
Antimony	90,000	31	0.55	U		0.58	U		0.57	U		0.58	U		0.58	U		0.55	U		0.58	U		0.59	U		0.56	U		0.42	J				
Barium	900	15,000	84		J	70		J	71		J	83		J	88		J	87		J	89		J	43		J	71		J	78	J	J			
Copper	45	3,100	8.7	Q		8.8	Q		8.8	Q		9.6	Q		13	Q		12	Q		13	Q		5.2	Q		8	Q		9.9	Q				
Lead	45	400	7.5	Q		8.7	Q		8.1	Q		8.8	Q		13	Q		13	Q		13	Q		7.1	Q		7.9	Q		9.7	Q				
Magnesium	NA	NA	5,100		J	3,100		J	3,000		J	3,400		J	3,500		J	3,300		J	3,500		J	1,500		J	3,200		J	3,100		J			
Potassium	NA	NA	2,800		J	1,800		J	2,000		J	2,300		J	2,500		J	2,400		J	2,500		J	1,600		J	1,800		J	2,100		J			
Zinc	90	23,000	34		J	33		J	34		J	28		J	34		J	34		J	36		J	19		J	32		J	27		J			
Explosives, mg/kg (SW8330B)																																			
1,3,5-Trinitrobenzene	NA	2,200	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
1,3-Dinitrobenzene	NA	6.1	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
2,4,6-Trinitrotoluene	NA	19	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
2,4-Dinitrotoluene	NA	1.6	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
2,6-Dinitrotoluene	NA	61	0.04	U		0.037	U		0.038	U		0.039	U		0.04	UM		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
2-Amino-4,6-dinitrotoluene	NA	150	0.04	U		0.037	U		0.038	U		0.039	U	UJ	0.04	UM	UJ	0.039	U	UJ	0.039	U		0.038	U		0.038	U		0.038	U	UJ			
2-Nitrotoluene	NA	2.9	0.08	U		0.074	U		0.077	U		0.078	U		0.08	U		0.079	U		0.078	U		0.077	U		0.075	U		0.076	U				
3-Nitrotoluene	NA	1,200	0.08	U		0.074	U		0.077	U		0.078	U		0.08	U		0.079	U		0.078	U		0.077	U		0.075	U		0.076	U				
4-Amino-2,6-dinitrotoluene	NA	150	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
4-Nitrotoluene	NA	30	0.1	U		0.092	U		0.096	U		0.098	U		0.1	U		0.098	U		0.098	U		0.096	U		0.094	U		0.095	U				
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	NA	5.5	0.08	U		0.074	U		0.077	U		0.078	U		0.08	U		0.079	U		0.078	U		0.077	U		0.075	U		0.076	U				
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NA	240	0.08	U		0.074	U		0.077	U		0.078	U		0.08	U		0.079	U		0.078	U		0.077	UM		0.075	U		0.076	U				
Nitrobenzene	NA	4.4	0.08	U		0.074	U		0.077	U		0.078	U		0.08	U		0.079	U		0.078	U		0.077	U		0.075	U		0.076	U				
Nitroglycerin	NA	6.1	0.4	U		0.37	U		0.38	U		0.39	U		0.4	U		0.39	U		0.39	U		0.38	U		0.38	U		0.38	U				
Octahydro-tetranitro-1,3,5,7-tetrazocine (HMX)	NA	3,800	0.04	U		0.037	U		0.038	U		0.039	U		0.04	U		0.039	U		0.039	U		0.038	U		0.038	U		0.038	U				
Pentaerythritol tetranitrate (PETN)	NA	NA	0.4	U		0.37	U		0.38	U		0.39	U		0.4	U		0.39	U		0.39	U		0.38	U		0.38	U		0.38	U				

Acronyms
FTBLS = Ft. Bliss
IS = Incremental Sample
mg/kg = milligrams per kilogram
RSL = Residential Screening Level
SS = Surface Sample
SW = Solid Waste
TCEQ = Texas Commission on Environmental Quality
USEPA = U.S. Environmental Protection Agency
LQ = Lab Qualifier and VQ = Validation Qualifer
J = Estimated Value--The analyte is positively identified but the reported concentration is an estimate due to QC failure or data quality limitations
M = Manual integrated compound
Q = One or more quality control criteria failed
U = The analyte was not detected above the reporting limit
UJ = Estimated value--The analyte is non-detected above the method detection limited (MDL) but the result is an estimate due to QC failure of data quality limitions

Notes
(1) 3X TCEQ State Background Levels (March 2007) have been used.
(2) U.S. EPA Regional Screening Levels (April 2009) have been used
(3) Test Method SW (EPA 1997)

Table 5-4: Former Maneuver Area Site Inspection Analytical Results Summary

Analyte	3 X TCEQ State Median Background Levels (mg/kg) ⁽¹⁾	USEPA RSLs for Residential Soils (mg/kg) ⁽²⁾	Sample ID			FTBLS-IS015			FTBLS-IS016		
			Sample Depth			Surface			Surface		
						Result (mg/kg)	LQ	VQ	Result (mg/kg)	LQ	VQ
Total Metals, mg/kg (SW6010C)											
Antimony	90,000	31				0.58	U		0.58	U	
Barium	900	15,000				94		J	27		J
Copper	45	3,100				8.1	Q		4.1	Q	
Lead	45	400				8	Q		5.9	Q	
Magnesium	NA	NA				3,800		J	1,100		J
Potassium	NA	NA				1,900		J	1,200		J
Zinc	90	23,000				27		J	15		J
Explosives, mg/kg (SW8330B)											
1,3,5-Trinitrobenzene	NA	2,200				0.038	U		0.04	U	
1,3-Dinitrobenzene	NA	6.1				0.038	U		0.04	U	
2,4,6-Trinitrotoluene	NA	19				0.038	U		0.04	U	
2,4-Dinitrotoluene	NA	1.6				0.038	U		0.04	U	
2,6-Dinitrotoluene	NA	61				0.038	U		0.04	U	
2-Amino-4,6-dinitrotoluene	NA	150				0.038	U	UJ	0.04	U	UJ
2-Nitrotoluene	NA	2.9				0.076	U		0.079	U	
3-Nitrotoluene	NA	1,200				0.076	U		0.079	U	
4-Amino-2,6-dinitrotoluene	NA	150				0.038	U		0.04	U	
4-Nitrotoluene	NA	30				0.094	U		0.099	U	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	NA	5.5				0.076	U		0.079	U	
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NA	240				0.076	U		0.079	U	
Nitrobenzene	NA	4.4				0.076	U		0.079	U	
Nitroglycerin	NA	6.1				0.38	U		0.4	U	
Octahydro-tetranitro-1,3,5,7-tetrazocine (HMX)	NA	3,800				0.038	U		0.04	U	
Pentaerythritol tetranitrate (PETN)	NA	NA				0.38	U		0.4	U	

Acronyms

FTBLS = Ft. Bliss

IS = Incremental Sample

mg/kg = milligrams per kilogram

RSL = Residential Screening Level

SS = Surface Sample

SW = Solid Waste

TCEQ = Texas Commission on Environmental Quality

USEPA = U.S. Environmental Protection Agency

LQ = Lab Qualifier and VQ = Validation Qualifier

J = Estimated Value--The analyte is positively identified but the reported concentration is an estimate due to QC failure or data quality limitations

M = Manual integrated compound

Q = One or more quality control criteria failed

U = The analyte was not detected above the reporting limit

UJ = Estimated value--The analyte is non-detected above the method detection limited (MDL) but the result is an estimate due to QC failure of data quality limitations

Notes

(1) 3X TCEQ State Background Levels (March 2007) have been used.

(2) U.S. EPA Regional Screening Levels (April 2009) have been used

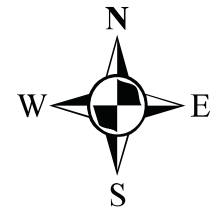
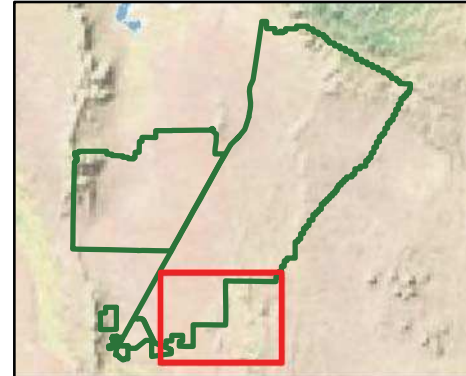
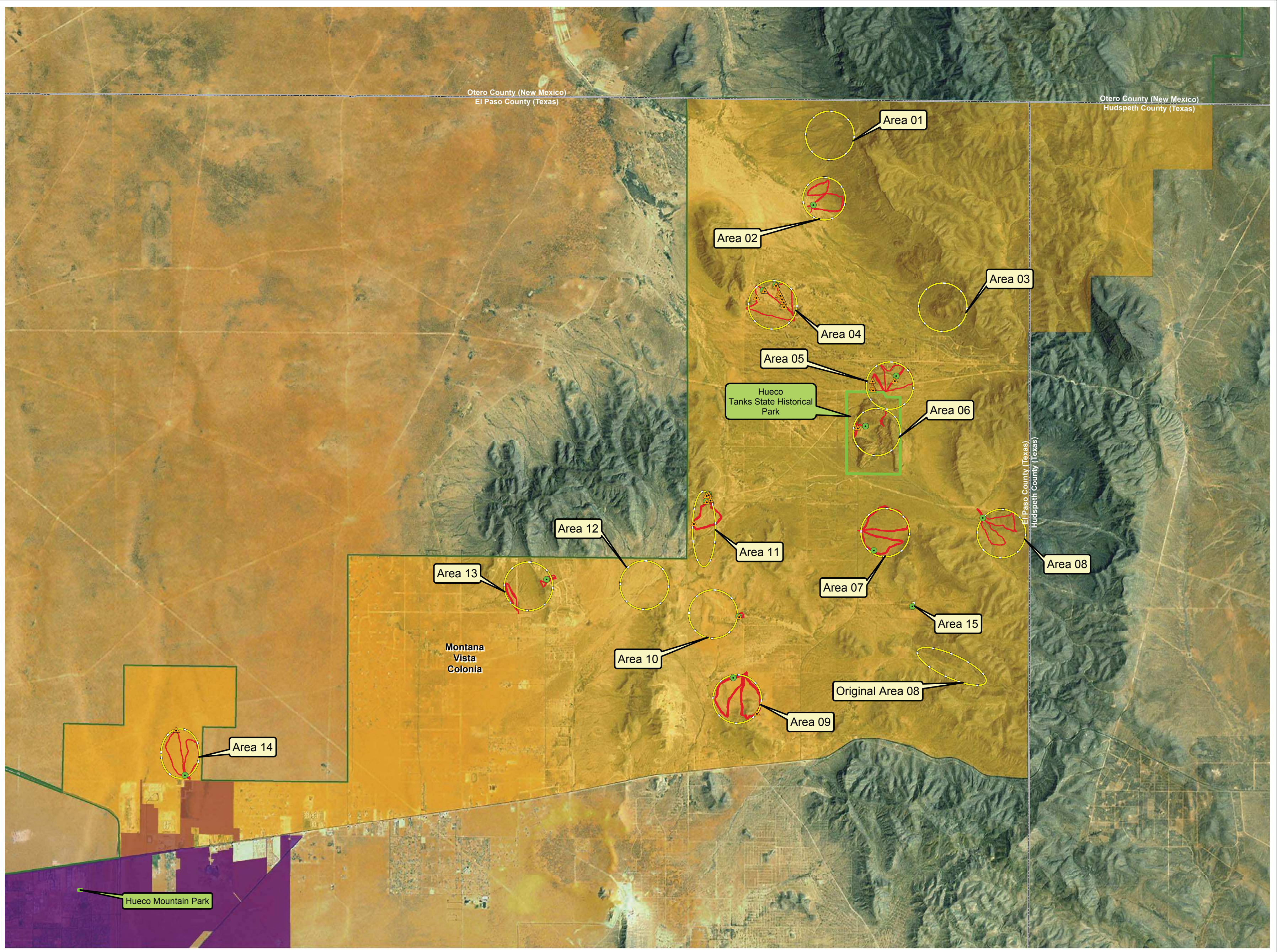
(3) Test Method SW (EPA 1997)



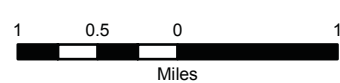
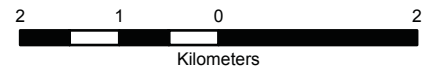
Site Inspection
Fort Bliss, TX



Figure 5-1
Former Maneuver Area
MR Site
Visual Survey Transects,
Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Areas
- Visual Survey Transects
- MD/MEC Finds
- Sample Locations



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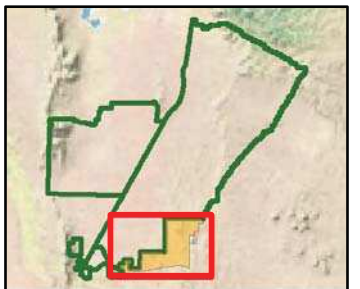


Site Inspection Fort Bliss, TX



Figure 5-2

Former Maneuver Area
MR Site - Accessibility to
Investigative Areas



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Gate
- Impassable Arroyo
- Trail Ends
- Washout
- Fence
- Routes to Survey Areas**
 - Accessible
 - Inaccessible
- Investigative Areas**
 - Surveyed
 - Not Surveyed

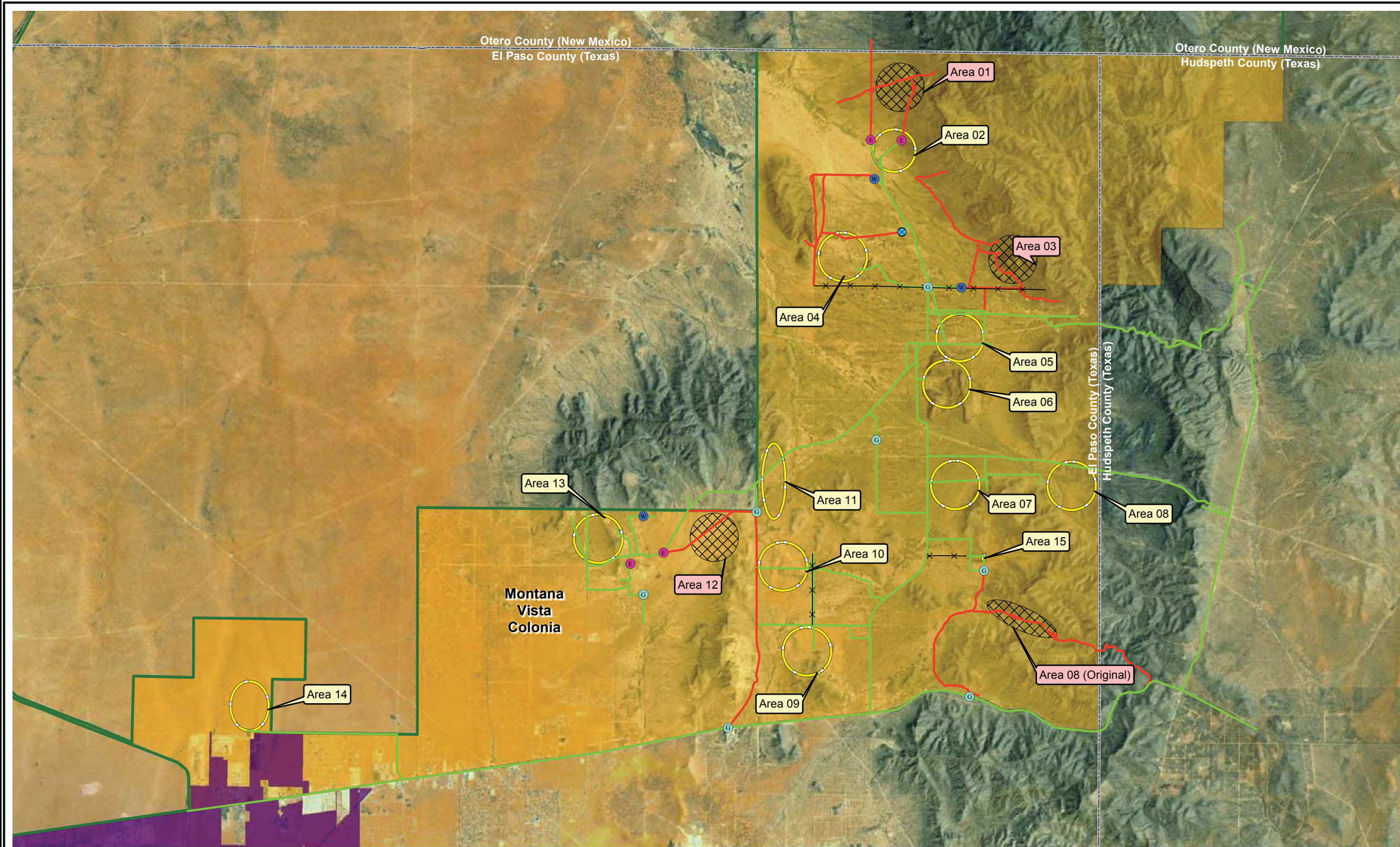
2 1 0 2
Kilometers

1 0.5 0 1
Miles

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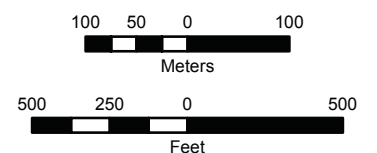
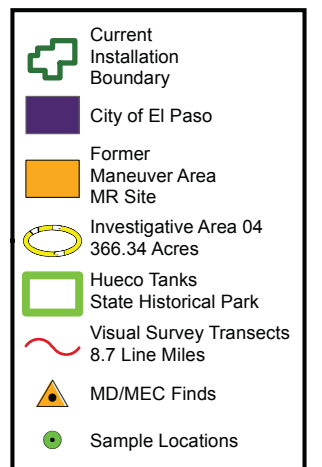
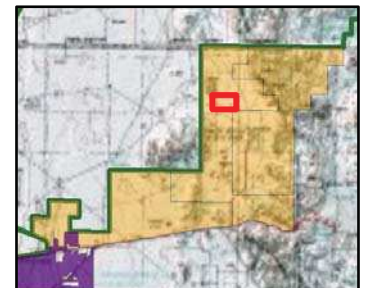


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Figure 5-3

Former Maneuver Area
MR Site - Investigative Area 04
Visual Survey Transects,
Sample Locations, and Finds



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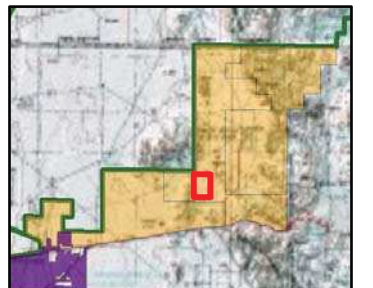


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Figure 5-4

Former Maneuver Area
MR Site - Investigative Area 10
Visual Survey Transects,
Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 10 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 3.13 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 0.51 Acres

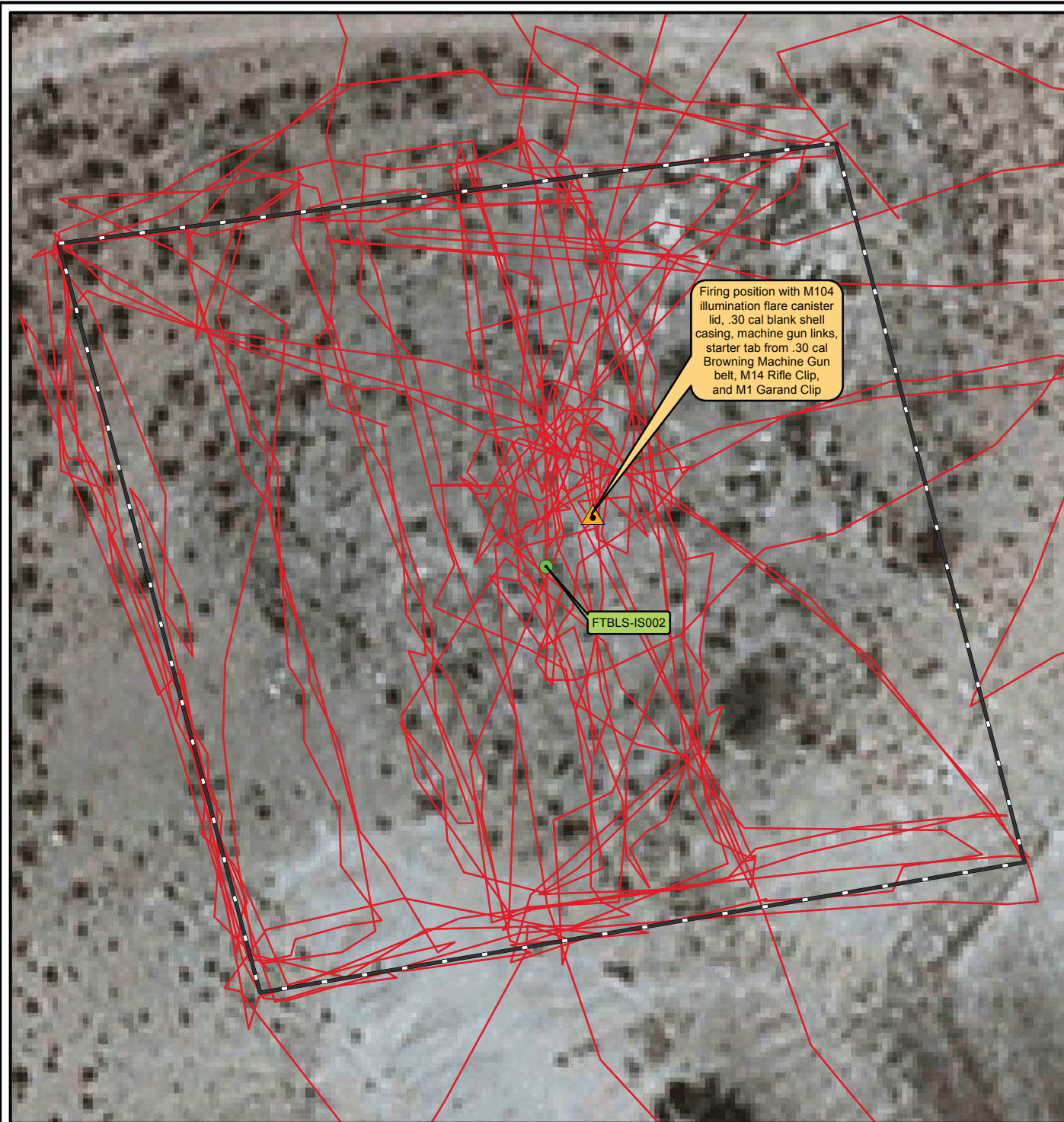
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Feet

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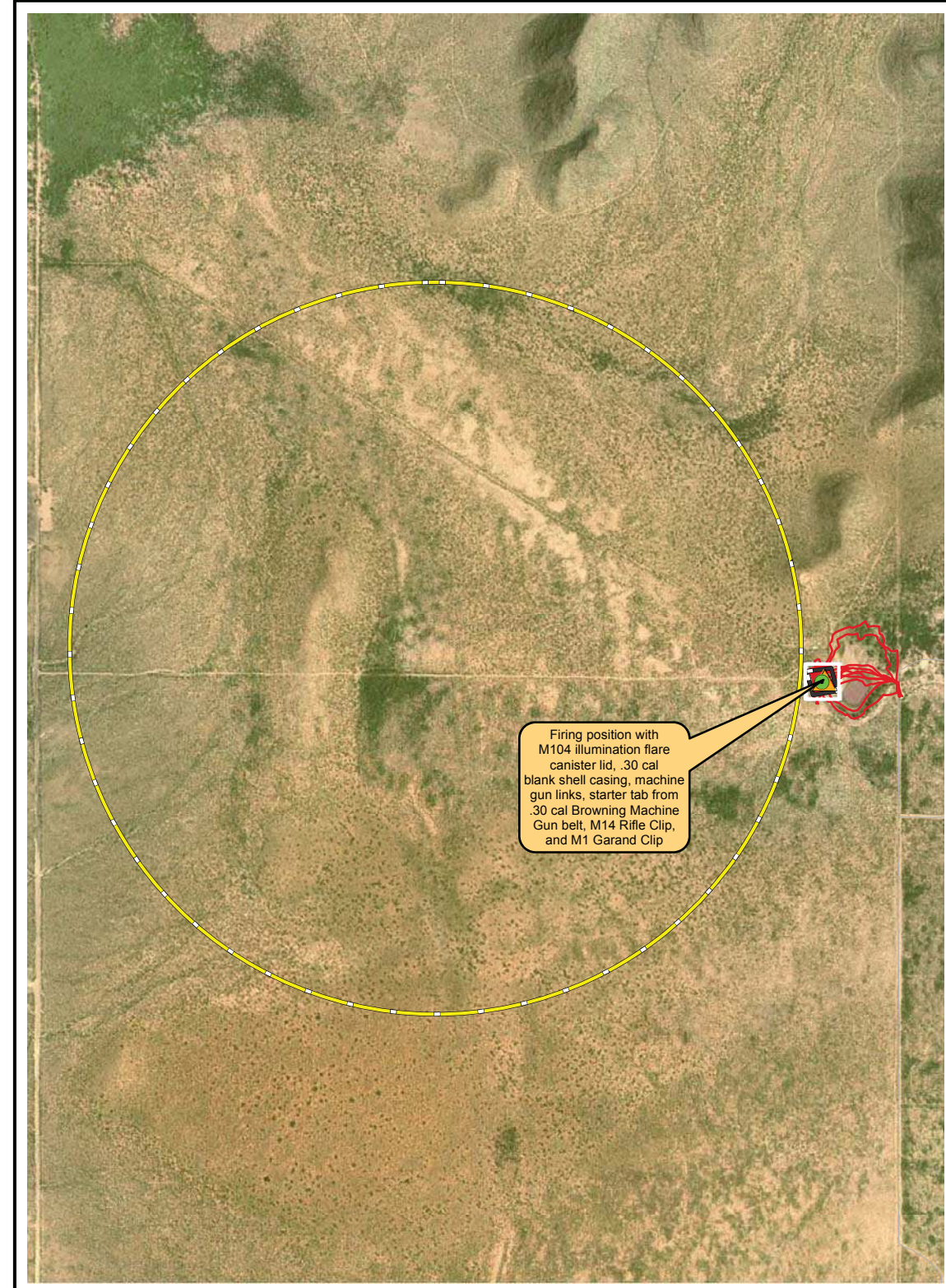
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Feet

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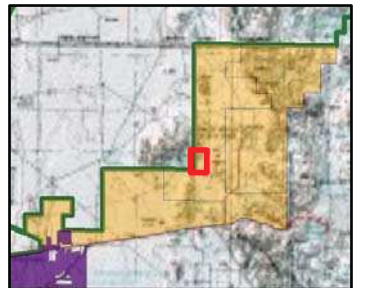


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Figure 5-5

Former Maneuver Area MR Site - Investigative Area 11 Visual Survey Transects, Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 11 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 9.47 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 0.41 Acres

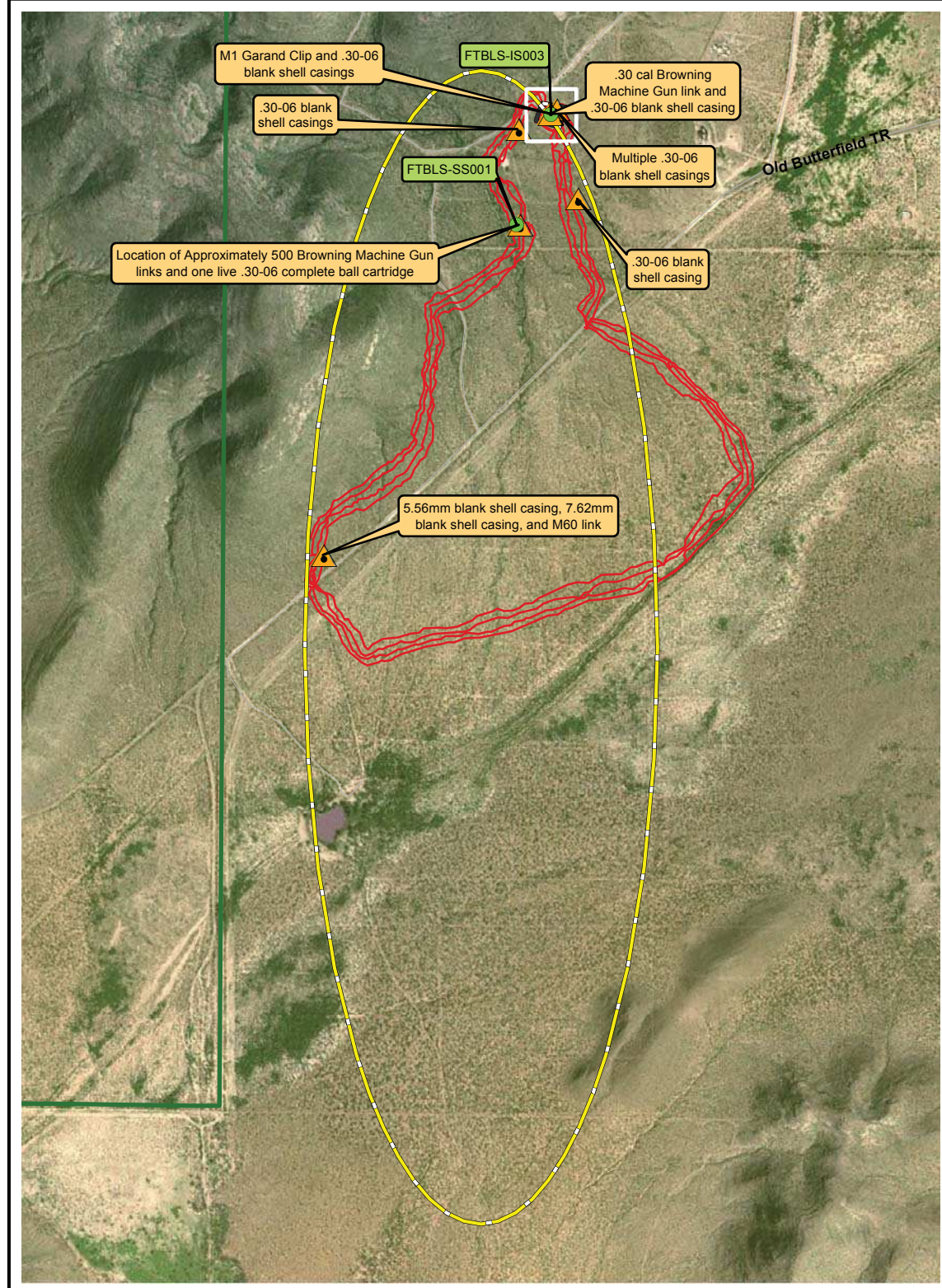
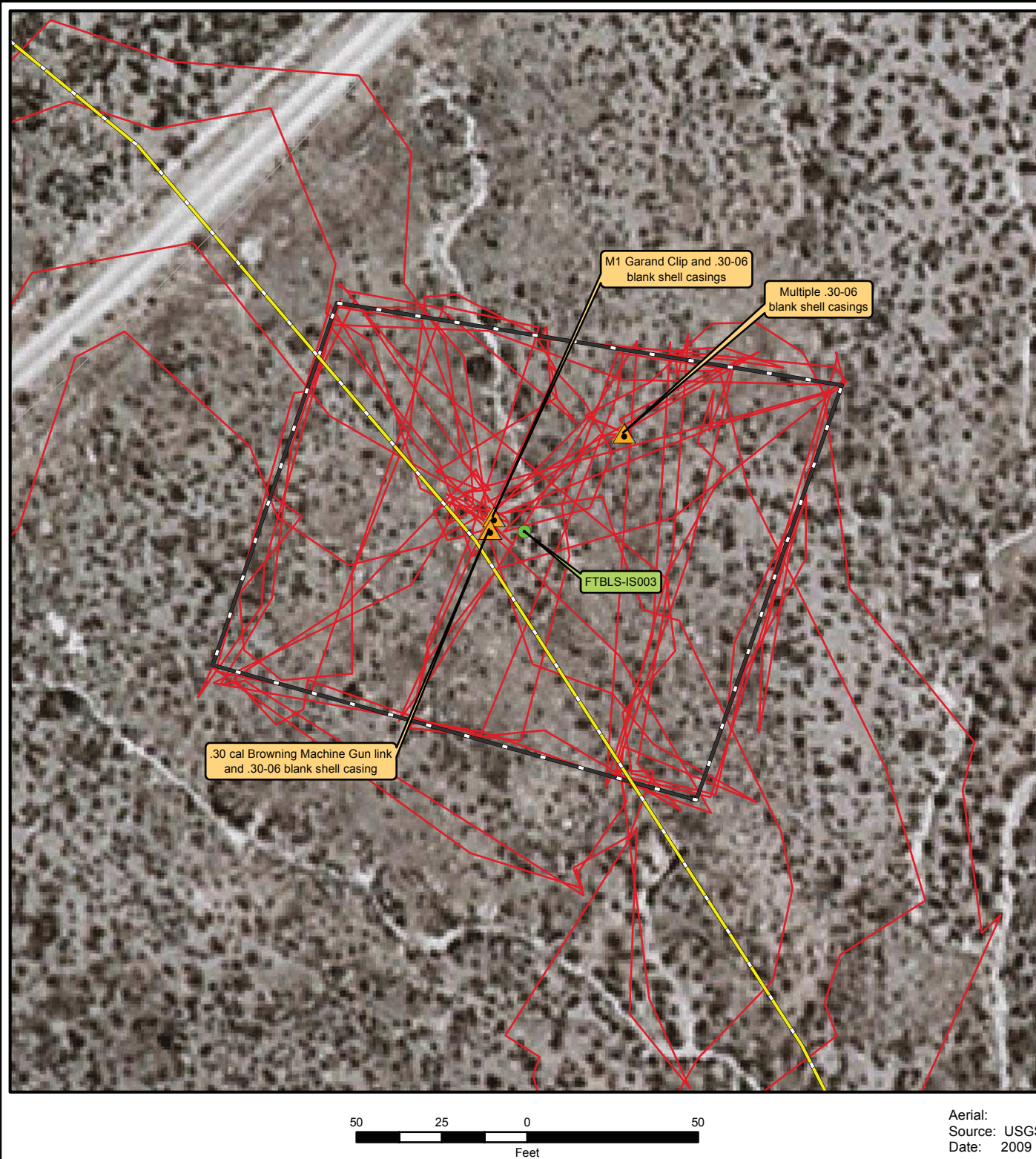
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Feet

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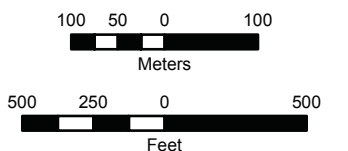


Figure 5-6

Former Maneuver Area
MR Site - Investigative Area 14
Visual Survey Transects,
Sample Locations, and Finds



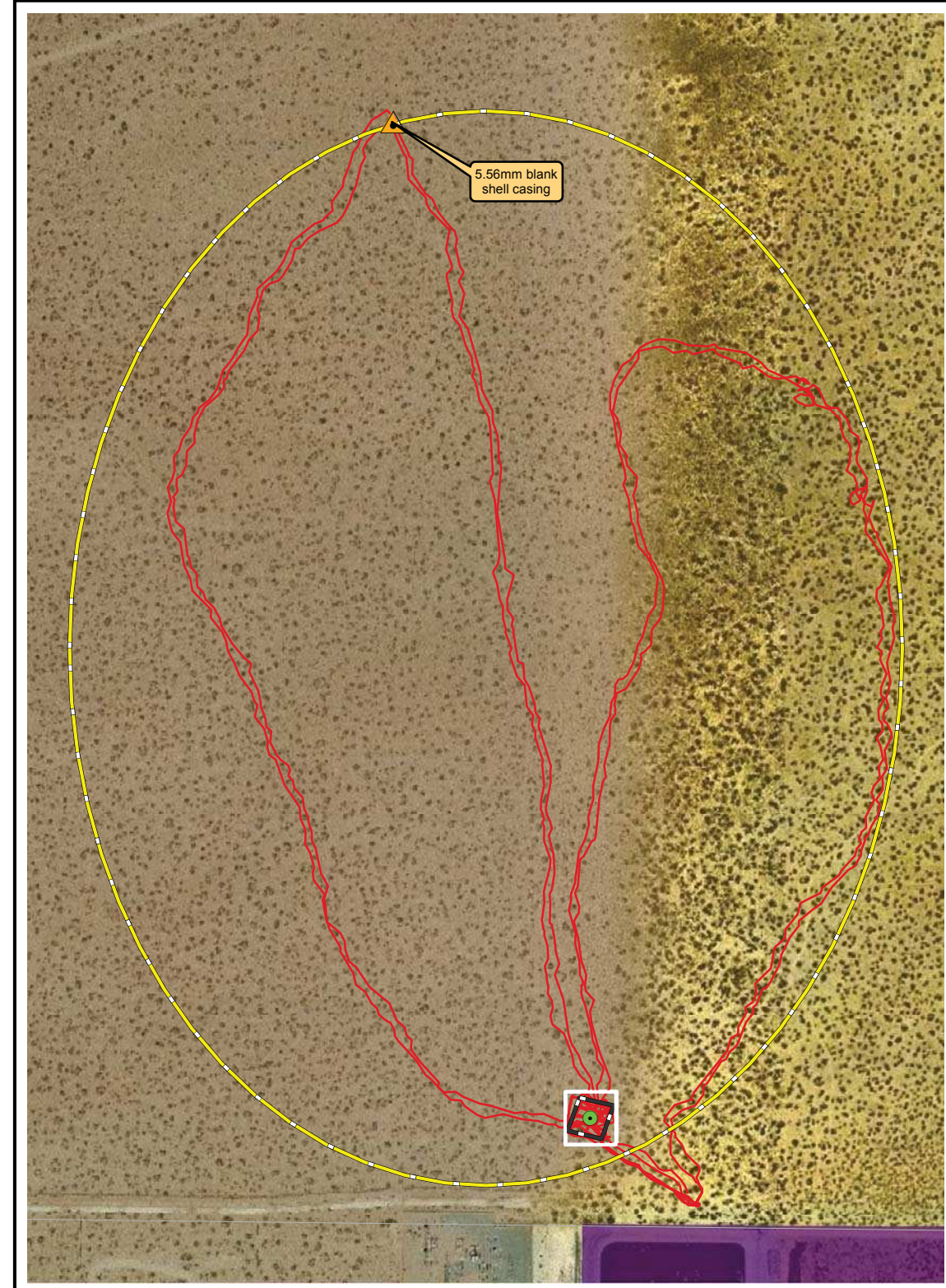
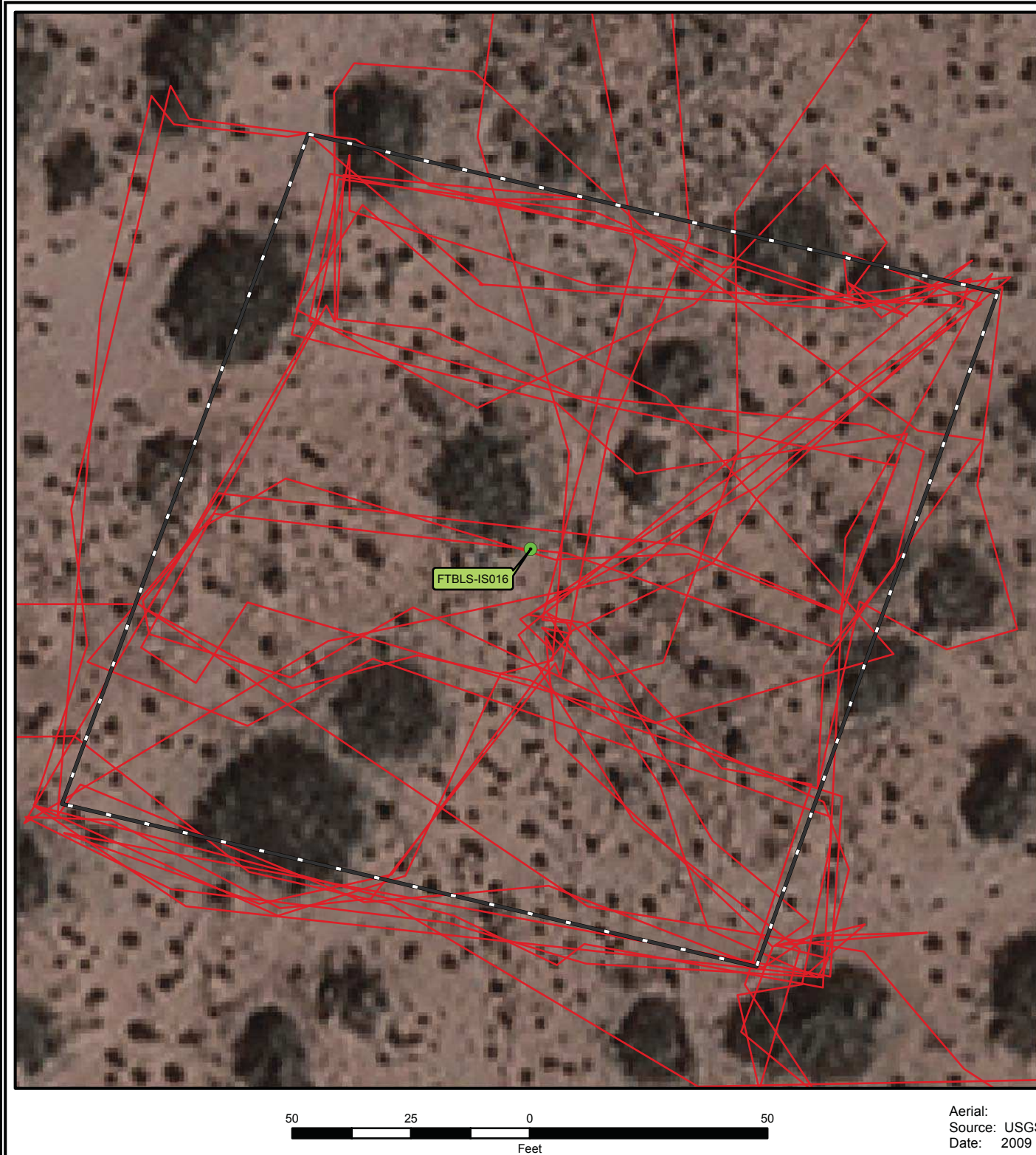
- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 14 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 9.21 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 0.51 Acres



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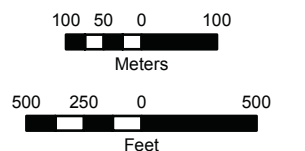


Figure 5-7

Former Maneuver Area
MR Site - Investigative Area 05
Visual Survey Transects,
Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 05 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 11.67 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 0.51 Acres



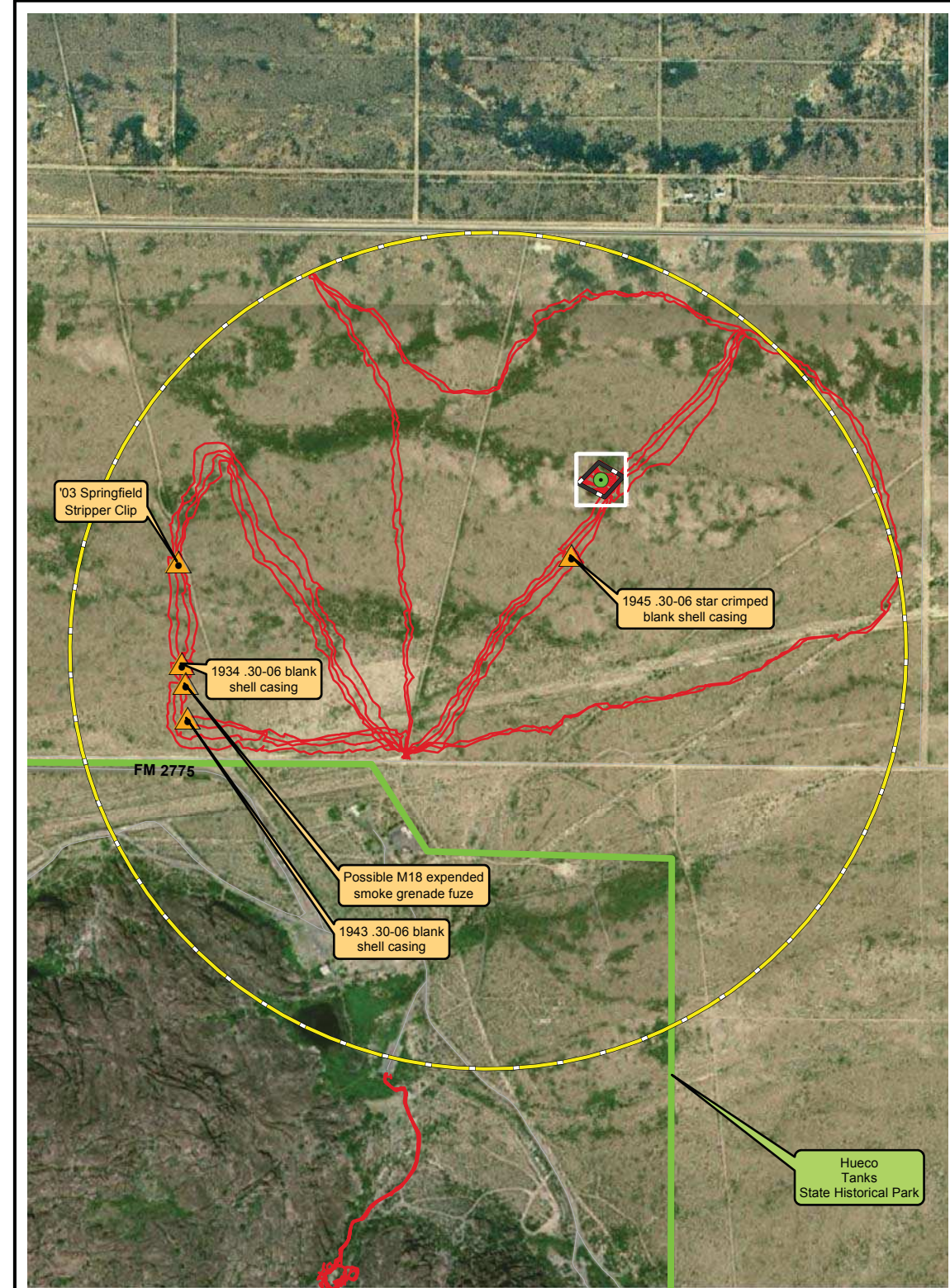
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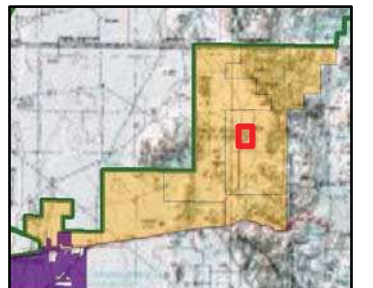


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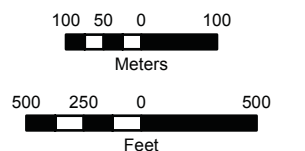


Figure 5-8

Former Maneuver Area
MR Site - Investigative Area 06
Visual Survey Transects,
Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 06 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 10.26 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 1.14 Acres



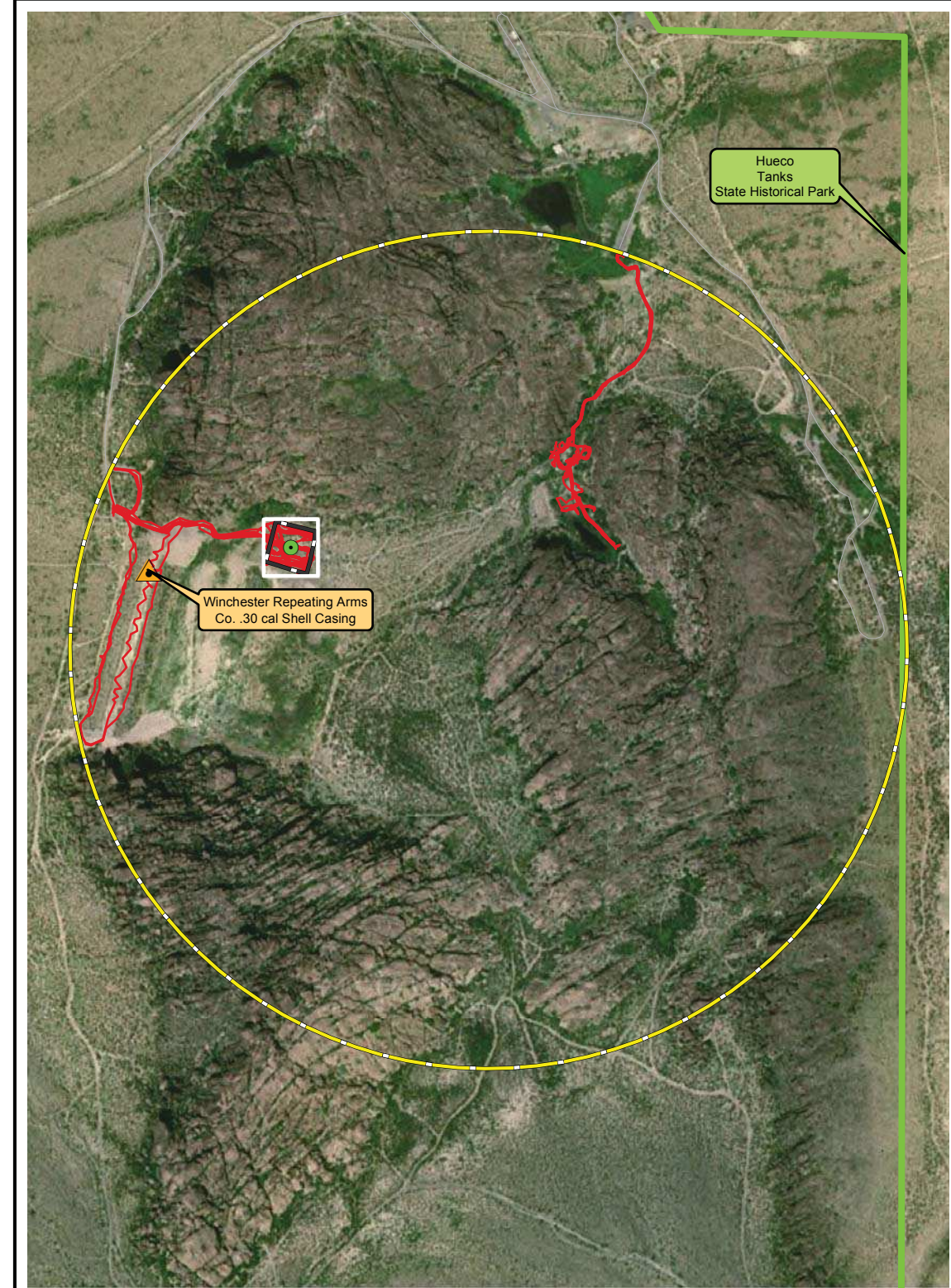
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Site Inspection Fort Bliss, TX



Figure 5-9

Former Maneuver Area
MR Site - Investigative Area 09
Visual Survey Transects,
Sample Locations, and Finds



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 09
- Hueco Tanks State Historical Park
- Visual Survey Transects 19.19 Line Miles
- MD/MEC Finds
- Sample Locations
- Incremental Sampling Unit 0.98 Acres

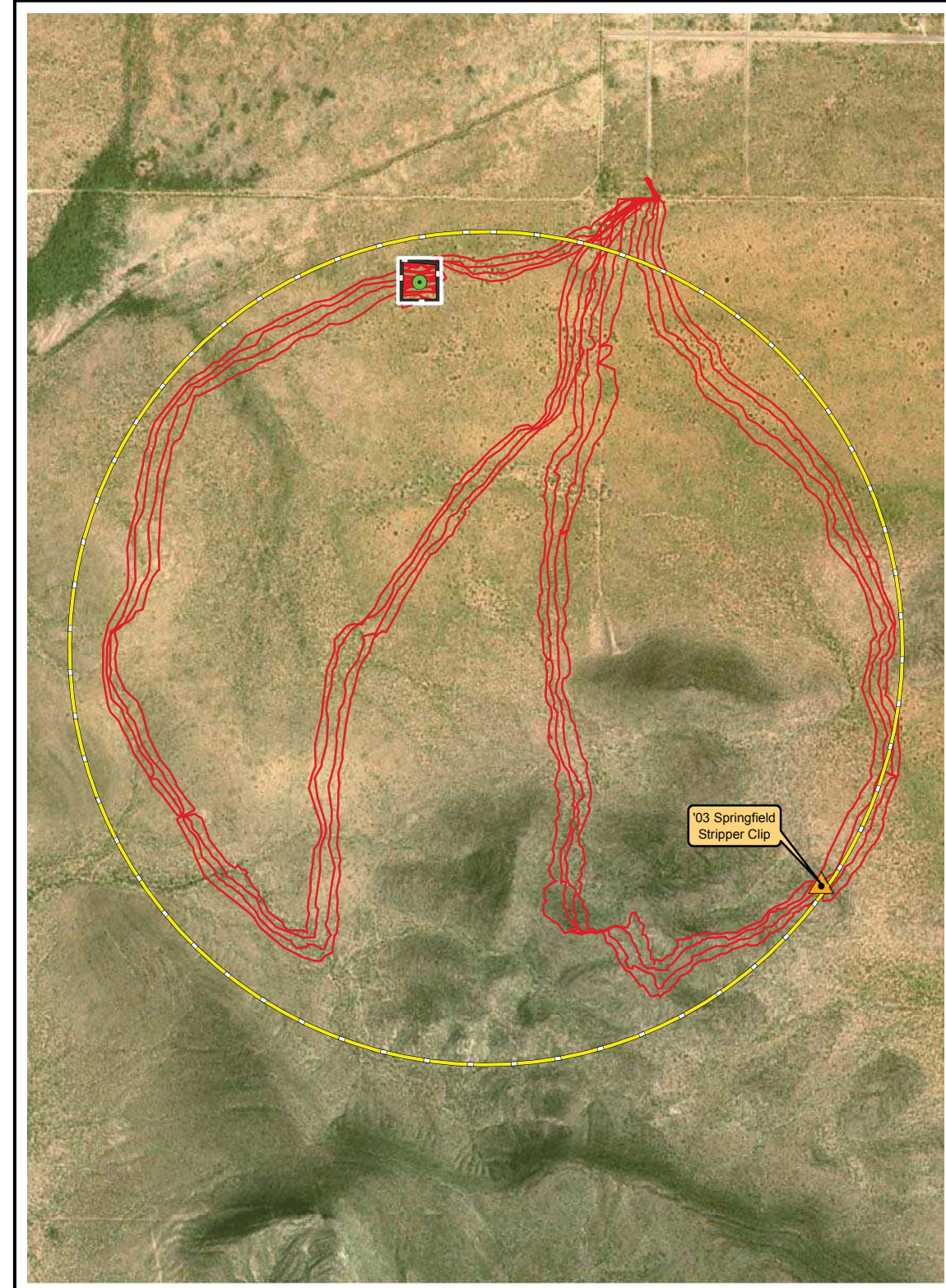
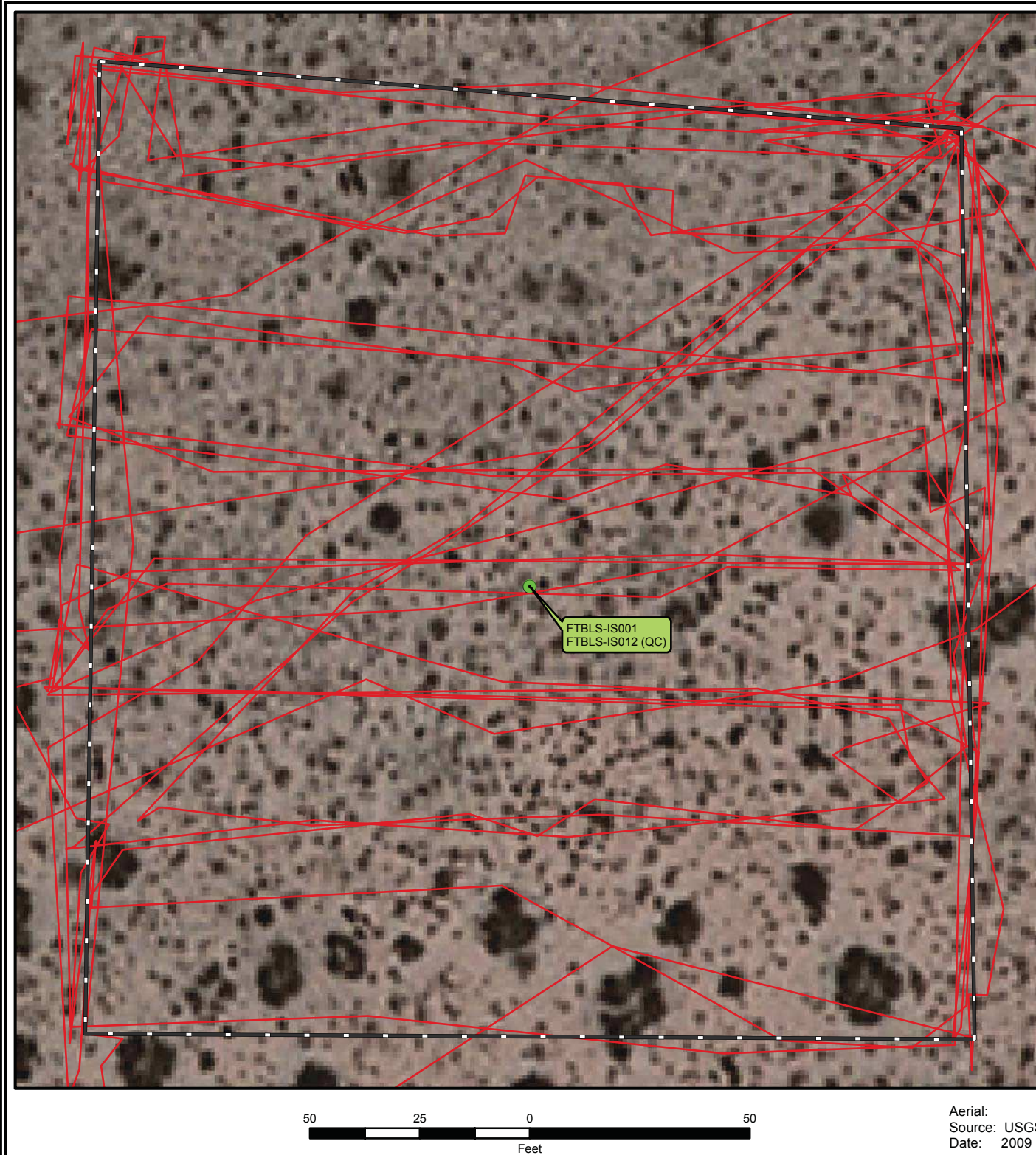
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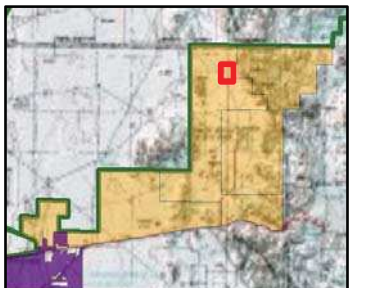


Site Inspection Fort Bliss, TX



Figure 5-10

Former Maneuver Area
MR Site - Investigative Area 02
Visual Survey Transects and
Sample Locations



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 02 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 8.66 Line Miles
- Sample Locations
- Incremental Sampling Unit 0.51 Acres

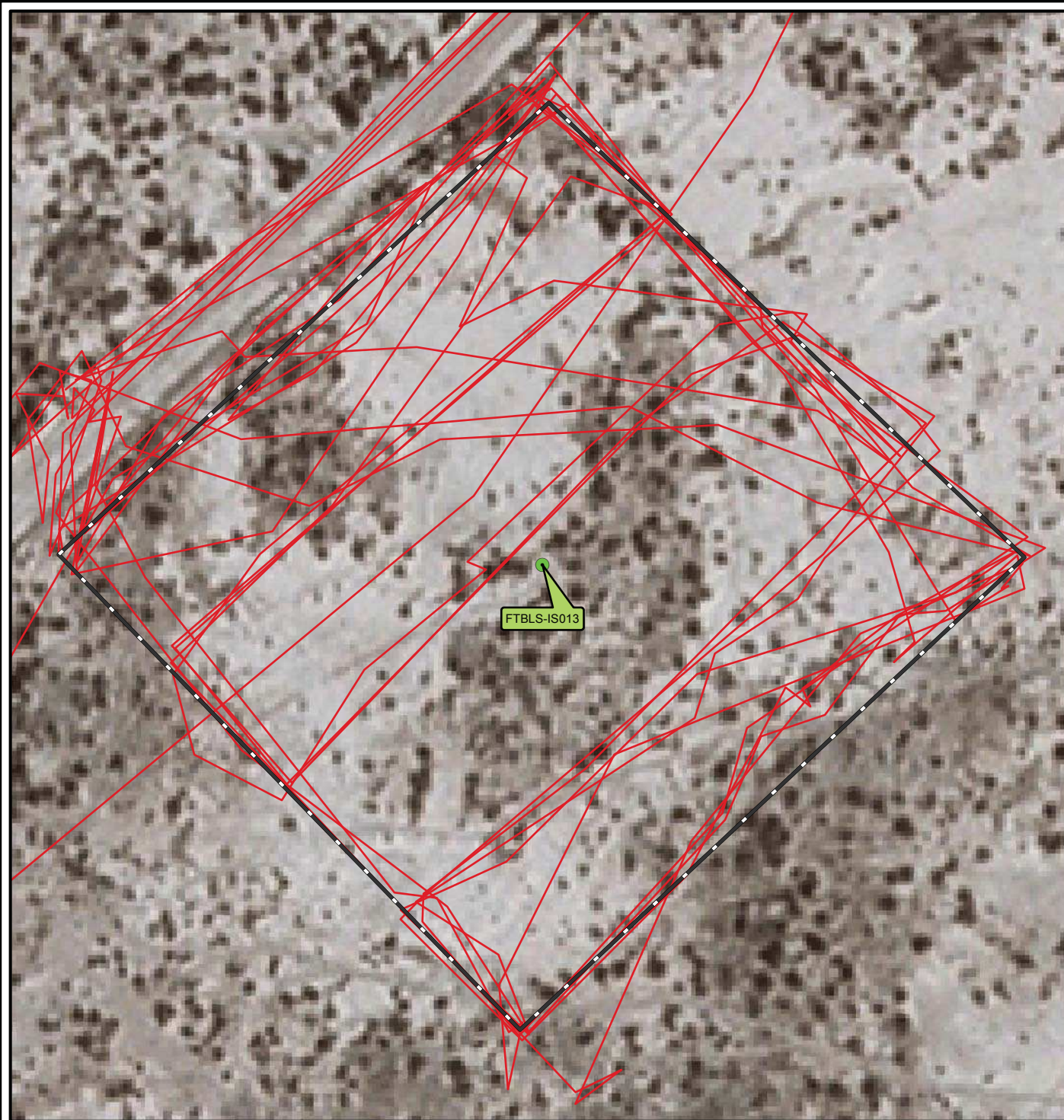
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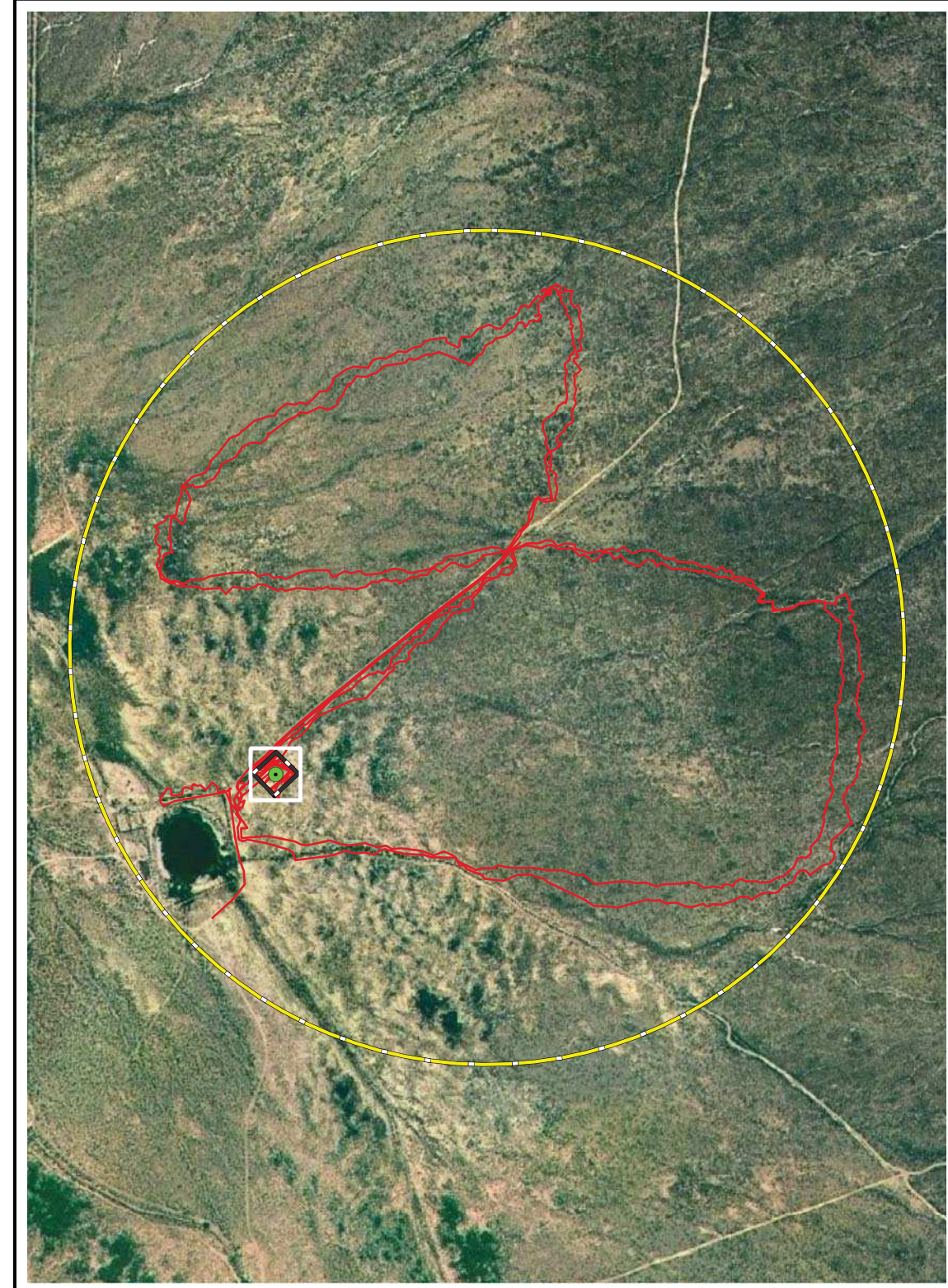
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Site Inspection Fort Bliss, TX

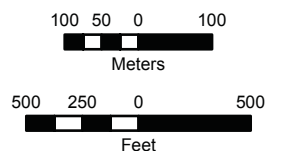


Figure 5-11

Former Maneuver Area
MR Site - Investigative Area 07
Visual Survey Transects and
Sample Locations



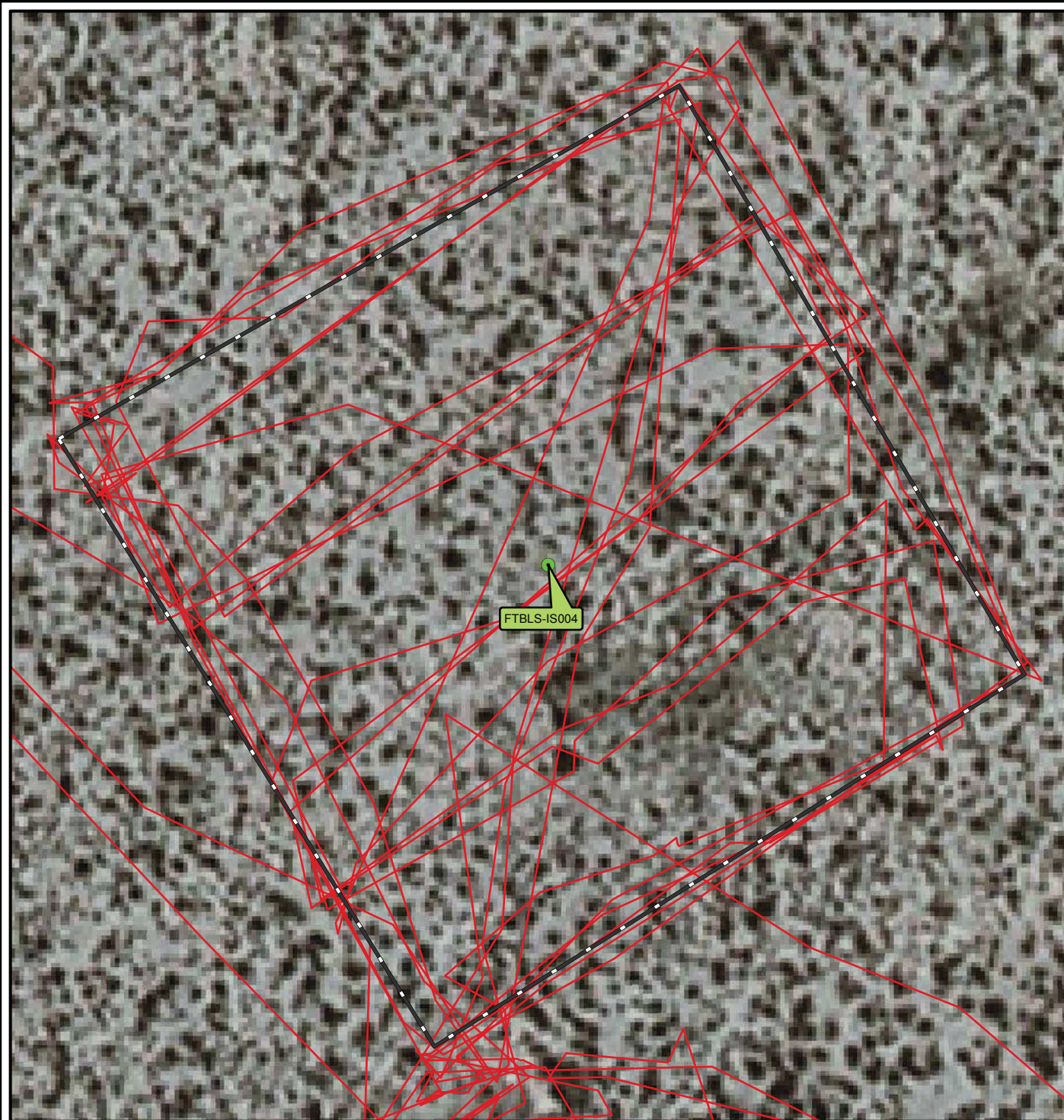
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- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 07 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 17.84 Line Miles
- Sample Locations
- Incremental Sampling Unit 0.53 Acres



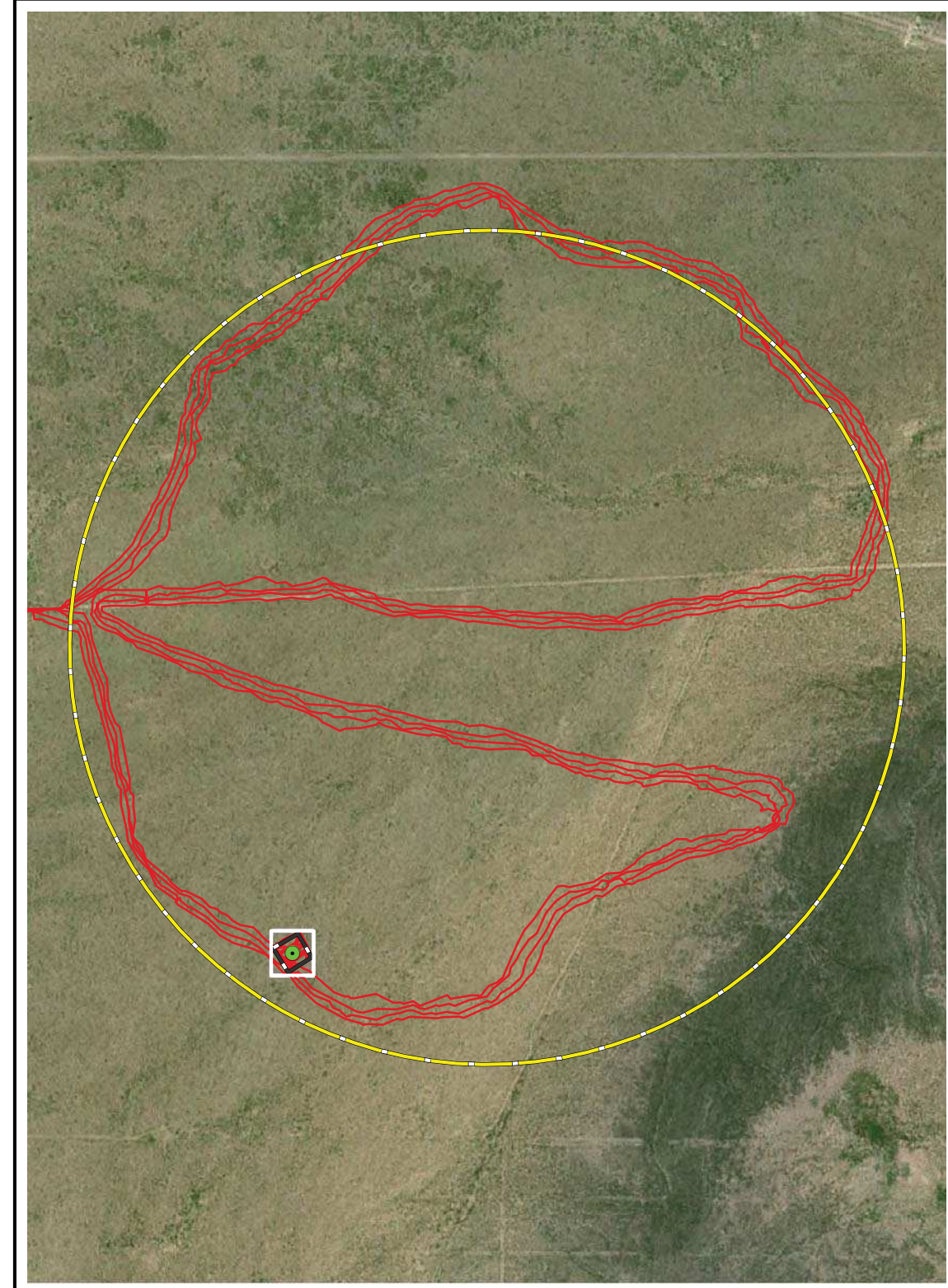
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Date: 2009



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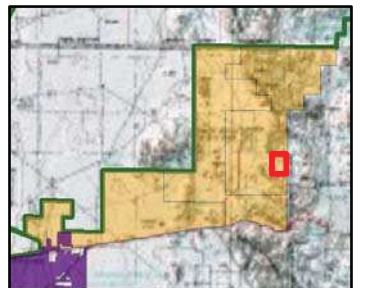


Site Inspection Fort Bliss, TX



Figure 5-12

Former Maneuver Area
MR Site - Investigative Area 08
Visual Survey Transects and
Sample Locations



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 08 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 9.74 Line Miles
- Sample Locations
- Incremental Sampling Unit 0.51 Acres

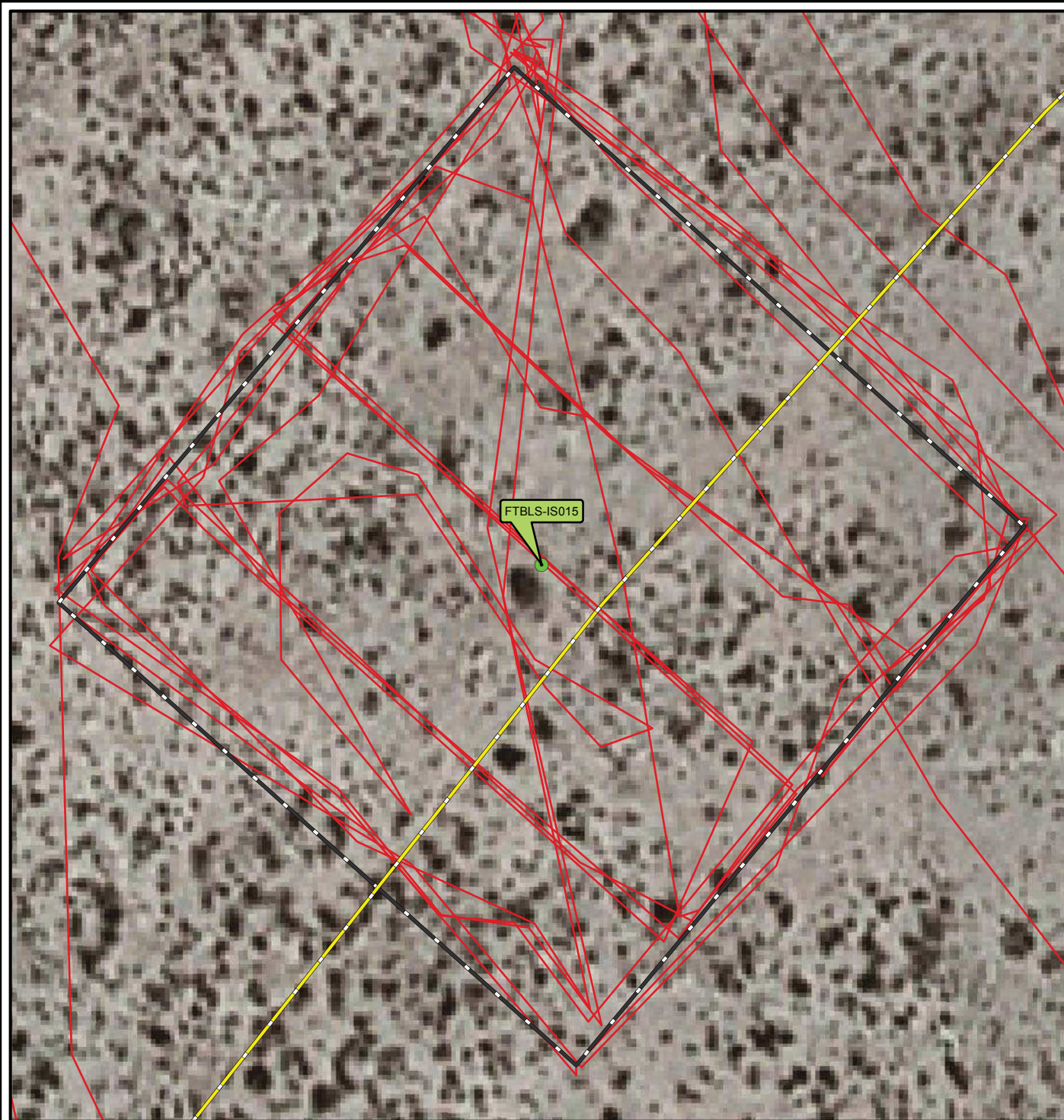
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Meters

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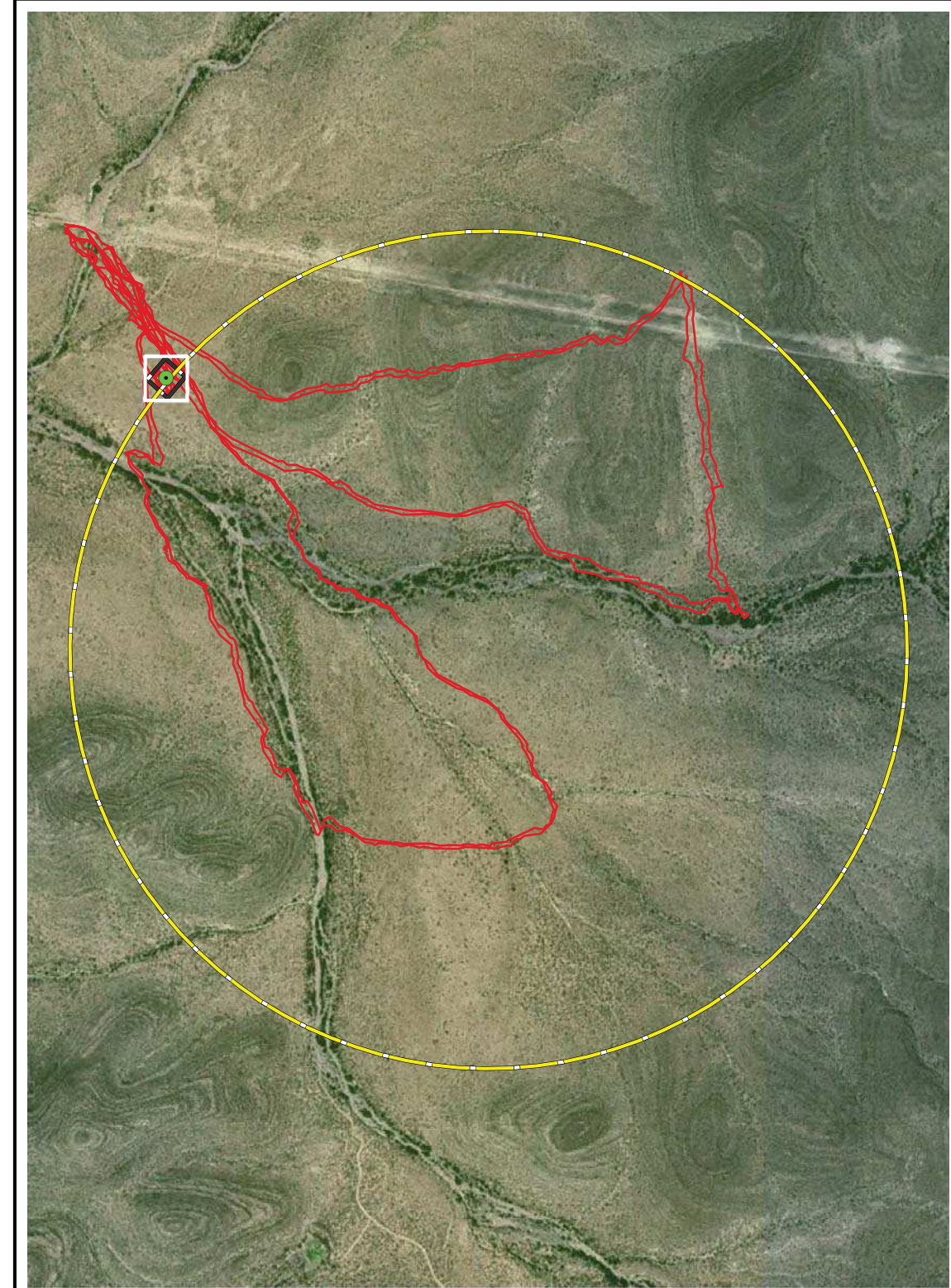
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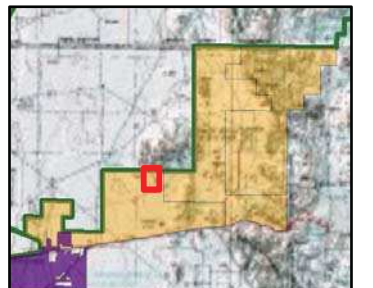


Site Inspection Fort Bliss, TX

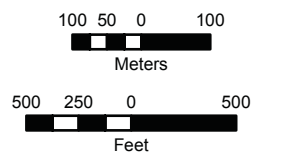


Figure 5-13

Former Maneuver Area
MR Site - Investigative Area 13
Visual Survey Transects and
Sample Locations



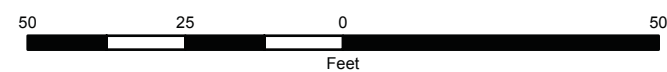
- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 13 366.34 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 8.82 Line Miles
- Sample Locations
- Site Features
- Incremental Sampling Unit 0.51 Acres



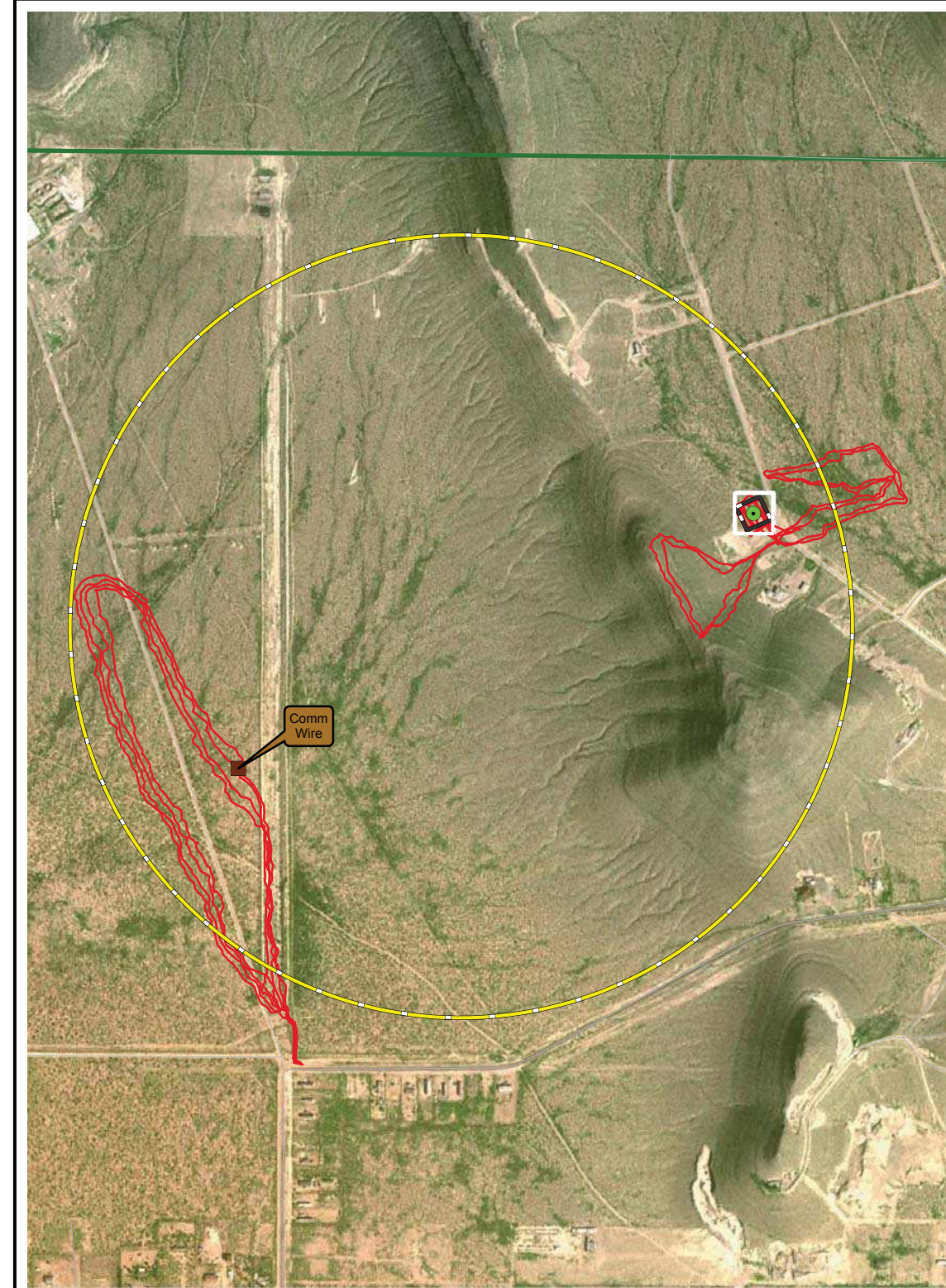
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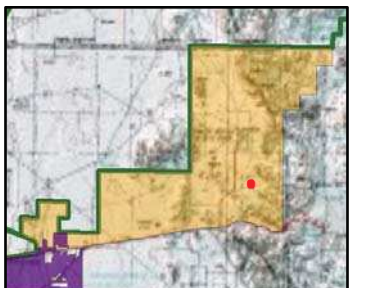


Site Inspection Fort Bliss, TX

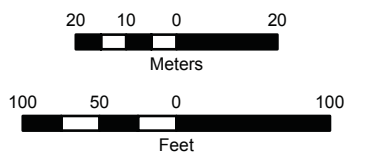


Figure 5-14

Former Maneuver Area
MR Site - Investigative Area 15
Visual Survey Transects and
Sample Locations



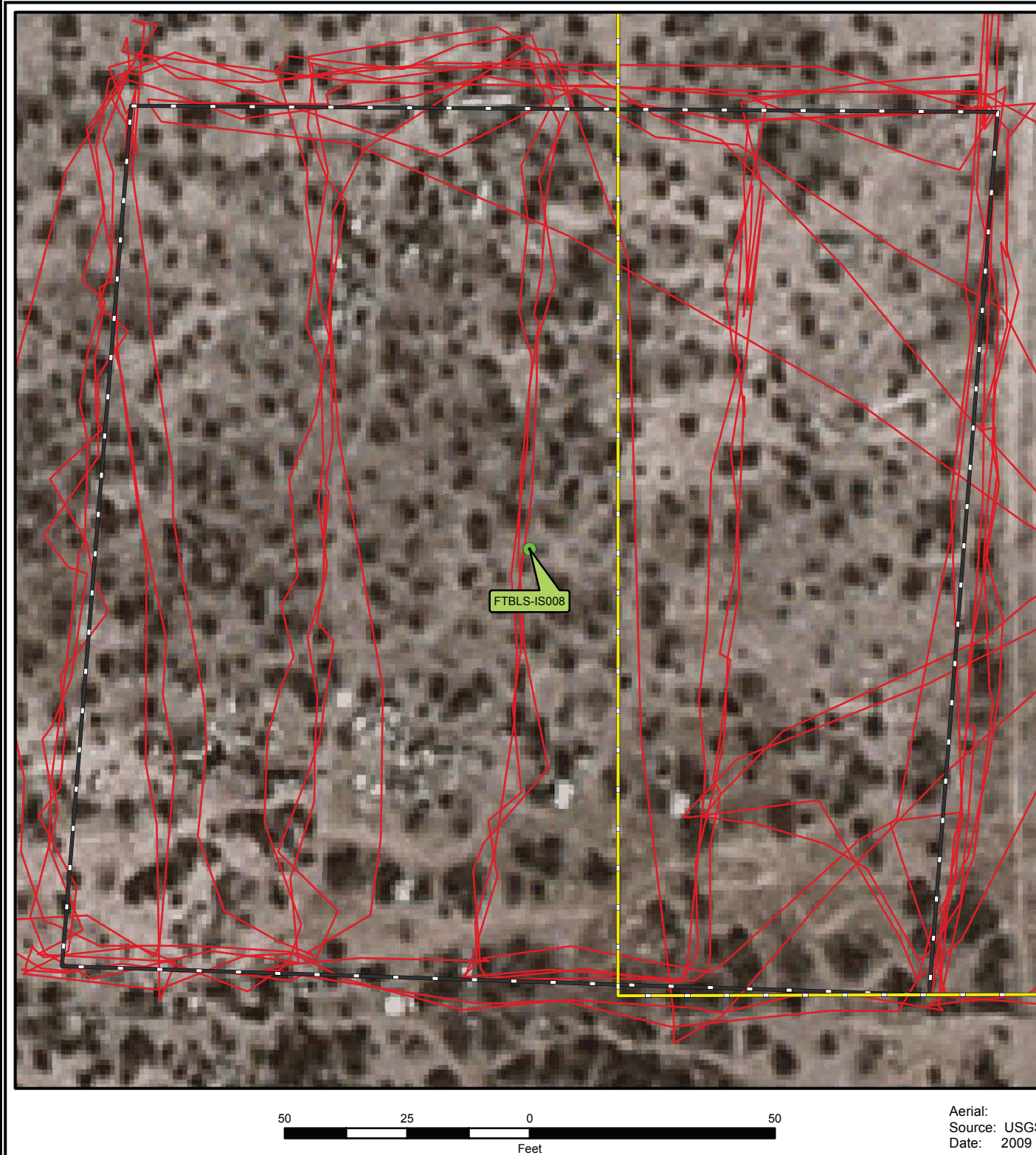
- Current Installation Boundary
- City of El Paso
- Former Maneuver Area MR Site
- Investigative Area 15 1.49 Acres
- Hueco Tanks State Historical Park
- Visual Survey Transects 1.68 Line Miles
- Sample Locations
- Incremental Sampling Unit 0.72 Acres



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Date: March 2011



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Date: 2009



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Section 6

6.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is a description of a site and its environment that is based on existing knowledge. The CSM describes sources of environmental contaminants or MEC hazards at a site, actual or potential pathways, current or proposed use of property, and potential receptors to contaminants or hazards. It will provide a planning tool to integrate site information from a variety of sources, evaluate the information with respect to project objectives and data needs, and respond through an iterative process for further data collection or action. The CSM development should be viewed as a process that reflects the progress of activities at a site from initial assessment through site closeout. Depending on the complexity of the investigation, typical information includes:

- Facility Profile describing all man-made features at or near the site;
- Physical Profile describing factors that may affect release, fate, and transport;
- Land Use and Exposure Profile providing information used to identify and evaluate the applicable exposure scenarios and receptor locations;
- Ecological Profile describing the physical relationship between developed and undeveloped portions of the site, use of the undeveloped portions, and ecological use;
- Release Profile relating the extent of contaminants or hazards in the environment.

One CSM (Table 6-1) was developed for the Former Maneuver Area MR site, which describes the general characteristics of the installation and the specific characteristics of the MR site.

Figures 6-1 and 6-2 present the exposure pathways for receptors to contact MEC at the Former Maneuver Area MR site. Figure 6-3 presents the exposure pathways for receptors to contact MC at the MR site. These figures are provided at the end of Section 6.0 of this report.

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss


Profile Type	Site Characterization
Facility Profile	Area and Layout: <ul style="list-style-type: none"> • The MR site is located in El Paso County and Hudspeth County, Texas • Fort Bliss and El Paso, Texas, are to the west of the site • The MR site is a transferred range comprised of 72,520.82 acres
	Structures: <ul style="list-style-type: none"> • Numerous residences, buildings, and road networks are present at the site • Commercial development including a tank farm and gravel quarries is located along Highway 62 (Photograph 6-1) • Buildings and structures associated with Hueco Tanks State Park and Historic Site (Hueco Tanks) are present, including a park office, historic ranch house, residences (two), maintenance facilities, and parking and camping facilities 
	<p style="text-align: center;">Photograph 6-1: Tank Farm Along Highway 62</p> Boundaries: <ul style="list-style-type: none"> • The MR site is located in the northeast portion of El Paso County, and a very small portion of northwest Hudspeth County, Texas • Bordered to the north by the McGregor Range and to the west by Fort Bliss and the city of El Paso • The Hueco Mountains are located on the eastern portion of the MR site • U.S. Highway 62 (Carlsbad Highway) runs along the southern portion of the MR site
	Utilities: <ul style="list-style-type: none"> • Electric, water, and sewer in residential areas and Hueco Tanks

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	Security: <ul style="list-style-type: none"> • None
Physical Profile	Climate: <ul style="list-style-type: none"> • Temperatures can be extreme, ranging from -8°F to 114°F, with a daily average of 64°F, and maximum and minimum daily averages of 76°F and 51°F • Average annual precipitation of 8 inches in the valleys and 20 inches in the mountains, occurring mainly during summer months • Days are typically warm, nights are cool, the area is frost-free for an average of 220 days per year
	Geology: <ul style="list-style-type: none"> • Located in the Basin and Range physiographic province, characterized by isolated, nearly parallel mountain ranges separated by broad flat basins • The Hueco Mountains are comprised of marine limestones from Pennsylvanian and Permian age underlain by Precambrian granites • The valley floor, known as the Hueco Bolson, is comprised of colluvial and alluvial sediment of Quaternary age • Caliche, lake deposits rich in salt and gypsum, and sand and gravel are the dominant sediment types in the basin area <div data-bbox="508 1184 1352 1818" data-label="Image"> </div> <p>Photograph 6-2: Transition of Mountain Range to Flat Basin</p>

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	<p>Topography:</p> <ul style="list-style-type: none"> • Ground surface elevations across the site range from approximately 3,900 feet to approximately 6,000 feet above sea level • Hueco Mountains are located on the eastern portion of the site • Hueco Tanks located within MR site, west of Hueco Mountains (Photograph 6-3) <div data-bbox="669 627 1198 1348" data-label="Image"> </div> <p>Photograph 6-3: Topography at Hueco Tanks</p> <p>Soil:</p> <ul style="list-style-type: none"> • No information was available specific to the MR site; however, based on assessments conducted for nearby areas with similar soils, the following information is provided: <ul style="list-style-type: none"> ○ Includes the soil associations/complexes: Pintura-Dona Ana, Wink, Simona, Limestone rock land-Lozier, and Lozier ○ Generally consist of sandy, silty, gravely loams; and fine sands and silts ○ Developed from the weathering of gypsum, sandstone, limestone, igneous, and metamorphic rocks ○ Soils in valleys and basins are shallow to deep, nearly level to very steep, well-drained to excessively drained soils ○ Soil erosion varies from low to severe across the site

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss


Profile Type	Site Characterization
	<p>Hydrogeology:</p> <ul style="list-style-type: none"> • Groundwater is obtained from fluvial and lacustrine environments, with fluvial aquifers being the primary source • The Hueco Bolson aquifer is located in this area, and consists of fluvial and lacustrine deposits up to 9,000 feet thick • Groundwater is recharged by precipitation percolating through alluvial deposits near mountain bases <p>Hydrology:</p> <ul style="list-style-type: none"> • No major source of surface water is present • Numerous intermittent streams drain from the Hueco Mountains on the eastern portion of the site into lower lying areas to the west • Numerous additional intermittent streams drain rock outcrops and high elevation areas in various directions around the site • Intermittent streams do not appear to drain to any main stream or river, but rather seep through the permeable soils into groundwater or are lost to evaporation • Rock formations and small depressions, or playas, contain water throughout the site over varying periods of time (Photograph 6-4) <div data-bbox="508 1142 1352 1772">  </div> <p>Photograph 6-4: Watering Hole in Depressed Area</p>

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss


Profile Type	Site Characterization
	<p>Vegetation:</p> <ul style="list-style-type: none"> Habitat in this area is mainly Chihuahuan Desert dominated by honey mesquite coppice dunes and sand scrub in low lying areas, containing plants such as soaptree yucca, four-wing saltbush, broom snakeweed, grasses, various annuals (Photograph 6-5) Some small areas in these dunes are dominated by grasses and yucca, while other areas contain creosote bush and cactus Lechugilla, creosote bush, and mariola are the main plants found in steep, rocky habitats in the Hueco Mountains Sideoats and black gramma grasslands compose vegetation found on gentler slopes  <p>Photograph 6-5: Vegetation in Hueco Mountains</p> <p>Wetlands:</p> <ul style="list-style-type: none"> Wetlands may be present in the form of arroyo-riparian drainages, although these habitats are not common Small seasonal wetlands are located throughout the rock hills at Hueco Tanks
<p>Land Use and Exposure Profile</p>	<p>Beneficial Resources:</p> <ul style="list-style-type: none"> Hueco Tanks (camping, hiking, rock climbing, and ecological, cultural and historic resources) Potable groundwater supplies Biological resources including rare wildlife and ecosystems

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	Current Land Use: <ul style="list-style-type: none"> • Residential housing • Light industry and commercial • Cattle grazing • Recreation, education, and wildlife preserve (Hueco Tanks) • Majority of the site is undeveloped
	Current Human Receptors: <ul style="list-style-type: none"> • Recreational (adult/child) • Residents (adult/child) • Industrial and commercial users • Military and installation personnel • Construction workers • Road and utility maintenance personnel • Ranchers (adult/child)
	Potential Future Land Use: <ul style="list-style-type: none"> • No anticipated change in land use
	Potential Future Human Receptors: <ul style="list-style-type: none"> • No anticipated change in human receptors
	Zoning/Land Use Restrictions: <ul style="list-style-type: none"> • According to the El Paso City website the following zoning areas exist in the western portion of the MR site: <ul style="list-style-type: none"> ○ C-2 and C-3 – Community Commercial ○ C-4 – Regional Commercial ○ R-F – Ranch & Farm ○ P-R-1 – Planned Residential • According to the El Paso County website the eastern portion of El Paso County encompasses rural/residential and rural/agricultural lands
	Demographics: <ul style="list-style-type: none"> • According to a 2009 census estimate, El Paso County had a population of 751,296 (http://quickfacts.census.gov) • According to a 2006 census estimate, the city of El Paso, Texas has a population of 609,415 (http://quickfacts.census.gov)

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
Ecological Profile	Habitat Type: <ul style="list-style-type: none"> • Mesquite coppice dunes • Mountain habitats • Intermittent streams • Playas and natural water-collecting rock formations • Large variety of unique habitats in the Hueco Tanks area
	Degree of Disturbance: <ul style="list-style-type: none"> • Possible disturbance from military activity • Disturbance from development of Hueco Tanks State Park and Historic Site facilities • Extensive disturbance in select areas due to construction of roadways, commercial and residential structures, and gravel operations
	Ecological Receptors: <ul style="list-style-type: none"> • Federal and/or state listed species of concern, threatened, and/or endangered species known to occur and/or to potentially occur within the MR site include: <ul style="list-style-type: none"> ○ 9 plants: Sneed pincushion and Sand prickly pear cacti, Alamo beardtongue, Organ Mountain evening primrose, Organ Mountain figwort, Standley whitlowgrass, Night blooming cereus, Hueco Mountains rock daisy, Nodding cliff daisy ○ 3 reptiles: Texas horned and Mountain short-horned lizards, Texas lyre snake ○ 16 birds: Interior least and Black terns, Northern aplomado falcon, Southwestern willow flycatcher, Bald eagle, Piping and Mountain plovers, White-faced ibis, Peregrine falcon, Northern goshawk, Ferruginous and Zone-tailed hawks, Mexican spotted and Western burrowing owls, Loggerhead shrike, Baird's sparrow, Costa's hummingbird, Varied bunting, Bell's and Grey vireos ○ 15 mammals: Small-footed myotis; Long-eared myotis (Photograph 6-6); Eastern small-footed bat; Occult little brown bat (Photograph 6-6); Fringed, Cave, Long-legged, and Yuma myotis; Townsend's pale big-eared bat; Spotted and Big free-tailed bats; Greater western mastiff bat; Gray-footed and Organ Mountain Colorado chipmunks; Black-tailed prairie dog ○ 2 insects: Anthony blister beetle, Los Olmos tiger beetle

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	<div data-bbox="500 415 1357 1050" data-label="Image"> </div> <p data-bbox="500 1052 1357 1119">Photograph 6-6: Long-eared myotis, <i>Myotis septentrionalis</i> (left), and Occult little brown bat, <i>Myotis lucifugus occultus</i> (right)</p> <ul data-bbox="380 1157 1487 1318" style="list-style-type: none"> • Hueco Tanks contains a large diversity of species, which include rare plant species • Hueco Tanks and similar rock basin areas host unusual seasonal hatchings of freshwater shrimp; attracting gray fox, bobcat, prairie falcon, golden eagle, lizard, and other predator species (http://www.tpwd.state.tx.us) <p data-bbox="370 1329 1073 1365">Cultural, Archaeological, and Historical Resources:</p> <ul data-bbox="380 1371 1487 1787" style="list-style-type: none"> • Resources present at Hueco Tanks include: <ul style="list-style-type: none"> ○ Historic adobe ranch house ○ Stone ruins ○ 29 prehistoric archaeological localities include: <ul style="list-style-type: none"> ○ Tools and debris from tool making activities ○ Ceramic sherds and jewelry ○ Remains of campsites ○ Small village site ○ Prehistoric water control system and historic dams ○ 273 rock panels with approximately 3,000 pictographs (Photograph 6-7)

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	<div data-bbox="495 380 1373 1010" data-label="Image"> </div> <p data-bbox="597 1012 1276 1045">Photograph 6-7: Pictograph Rock Panel at Hueco Tanks</p> <ul data-bbox="381 1079 1432 1350" style="list-style-type: none"> • No information was located for potential cultural, archeological, or historical resources for the remainder of the MR site; however, based on input from the installation and Native American Tribal groups, there is a potential for cultural resources to be located throughout the site. <ul style="list-style-type: none"> ◦ Investigations for a site to the west revealed numerous archeological sites, including pueblos, field houses, pit house villages, isolated pit structures, thermal features, reservoirs, caches, and lithic and ceramic scatters
Munitions Release Profile	<p data-bbox="370 1360 610 1394">Munitions Types:</p> <ul data-bbox="381 1398 1477 1686" style="list-style-type: none"> • Small arms live rounds: <ul style="list-style-type: none"> ◦ Springfield (.30-06), M1 (.30 caliber), M2 (.50 caliber), M16 (5.56 mm), M14 (7.62 mm) • Small arms blanks • Pyrotechnics (including smoke grenades and other undetermined types) • Artillery <ul style="list-style-type: none"> ◦ M2 4.2-inch mortar shells <p data-bbox="370 1703 662 1736">Release Mechanisms:</p> <ul data-bbox="381 1740 1393 1871" style="list-style-type: none"> • Intentional munitions firing • Simulation of war time activities during maneuver and/or training exercises • Discarded or malfunctioned rounds

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	<p>Maximum Probable Penetration Depth:</p> <ul style="list-style-type: none"> • The area was utilized as a maneuver and training area; therefore, penetration of the ground surface is not anticipated because firing lines and target areas have not been identified within the majority of the MR site • Although not identified during SI field activities, if firing lines and target areas are present within the MR site, penetration of small arms rounds is anticipated to be limited to the near surface • Pyrotechnics may be present on the surface, but would not be expected to penetrate below the ground surface • Based on the soil type and munitions type, penetration of the mortar shells identified in Investigative Area 4 is not anticipated to exceed 18-24 inches
	<p>MEC Density:</p> <ul style="list-style-type: none"> • No MEC was observed within the visual survey areas; therefore, MEC density is anticipated to be low throughout the site • Although not anticipated based on SI field activities, if small arms firing lines and target areas are present, MEC density is expected to be low and would only be anticipated at the firing line
	<p>Munitions Debris:</p> <ul style="list-style-type: none"> • MD was randomly scattered throughout the visual survey areas located in proximity to the installation boundary; therefore, it is anticipated to be scattered throughout all areas along the installation boundary. Other than the 4.2-inch mortar fragments identified in Investigative Area 4, the majority of the MD was related to small arms.

Table 6-1: Conceptual Site Model
Former Maneuver Area MR Site, Fort Bliss

Profile Type	Site Characterization
	<p>Associated Munitions Constituents:</p> <ul style="list-style-type: none"> • Based on analytical results from samples collected during the SI field activities, no metals identified as MC are present at levels above the screening criteria • Based on analytical results for samples collected during the SI field activities, no explosives were detected in the samples • Detailed information regarding MC associated with munitions used at Former Maneuver Area MR Site is included in the HRR • Potential MC from the M2 4.2-inch mortar shells identified during the SI field activities include iron, manganese, sulfur, phosphorus, copper, lead, zinc, aluminum, magnesium, titanium, chromium, white phosphorus, sulfur-trioxide chlorosulfonic acid solution (FS), 2,4,6-trinitrophenylmethylnitramine (tetryl), NC, NG, diethylphthalate, potassium nitrate, ethyl centralite, barium nitrate, lead styphnate, antimony sulfide, tetrazene
	<p>Transport Mechanisms/Migration Routes:</p> <ul style="list-style-type: none"> • Precipitation and runoff from heavy summer monsoon storms may cause flash-flooding, accelerating transport and migration of contaminants of concern (COCs) into groundwater • Although it is not anticipated that the majority of the munitions used at the site would penetrate the ground surface during release, there is a potential for MEC and MD to be buried as a result of wind and water erosion • Development associated with commercial and residential properties as well as the Hueco Tanks State Park and Historic Site facilities may have caused soil to be transported offsite or COCS to be disturbed in soil
	<p>Pathway Analysis:</p> <ul style="list-style-type: none"> • No MEC was observed; however, based on the MD that was observed during visual surveys in portions of the site the pathway for MEC is considered potentially complete (Figure 6-1) • No MEC and no MD were observed during visual surveys throughout a majority of the site; therefore, the pathway for MEC is considered incomplete (Figure 6-2) • No MC was identified at levels over the screening criteria for surface soil samples collected during the SI field activities; therefore, the pathways for human receptors to contact MC is considered incomplete (Figure 6-3)

Figure 6-1: Potentially Complete Exposure Pathways for Receptors to MEC within Portion of the Former Maneuver Area MR Site

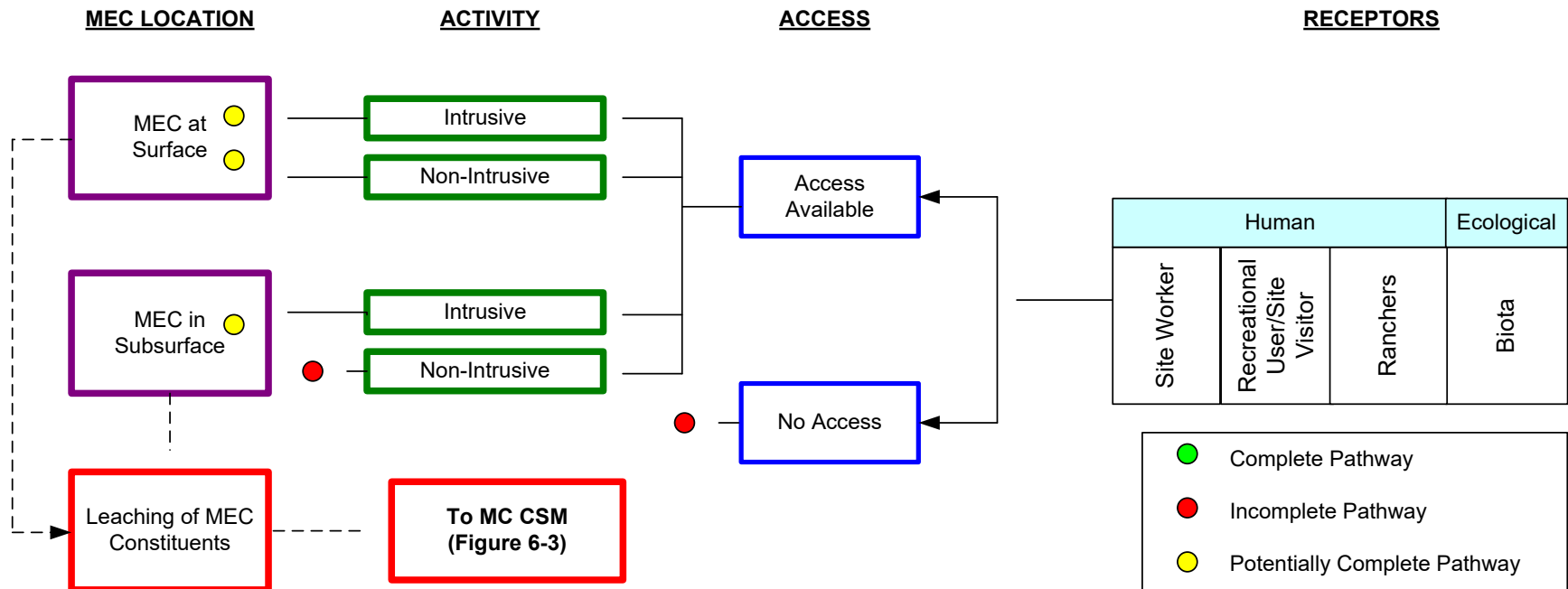


Figure 6-2: Incomplete Exposure Pathways for Receptors to MEC within Portion of the Former Maneuver Area MR Site

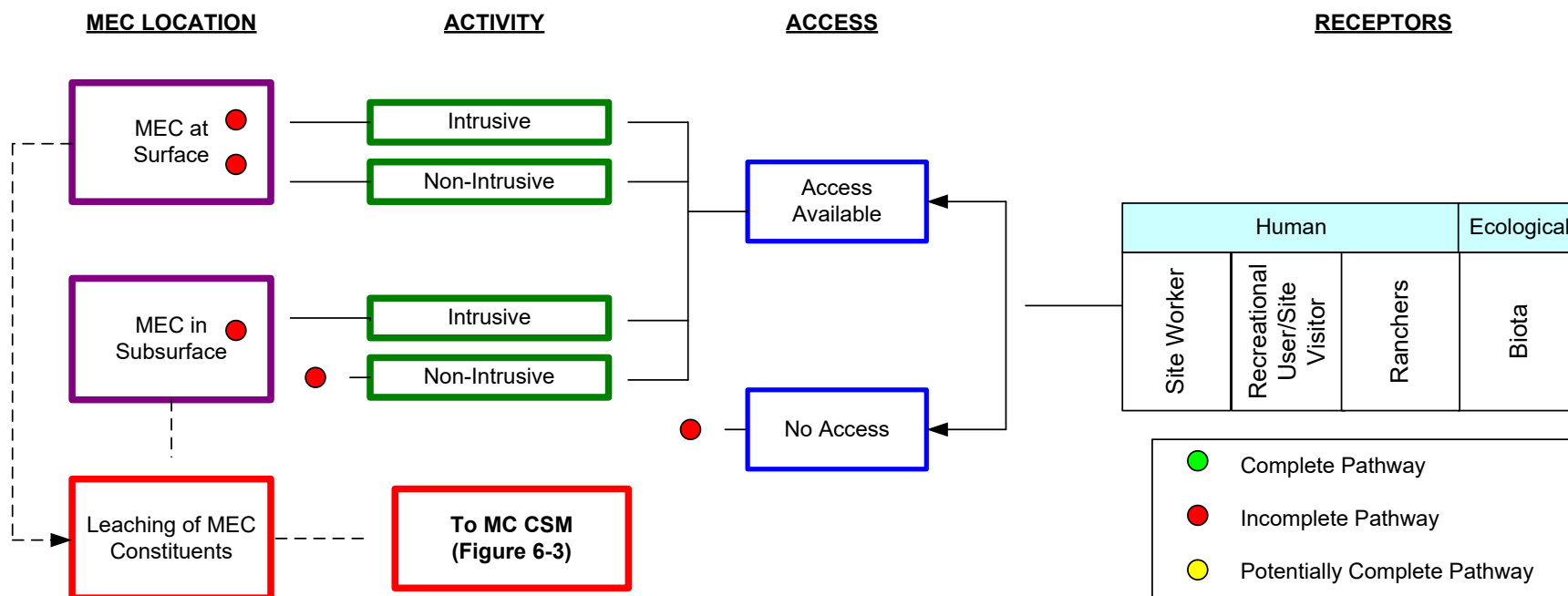
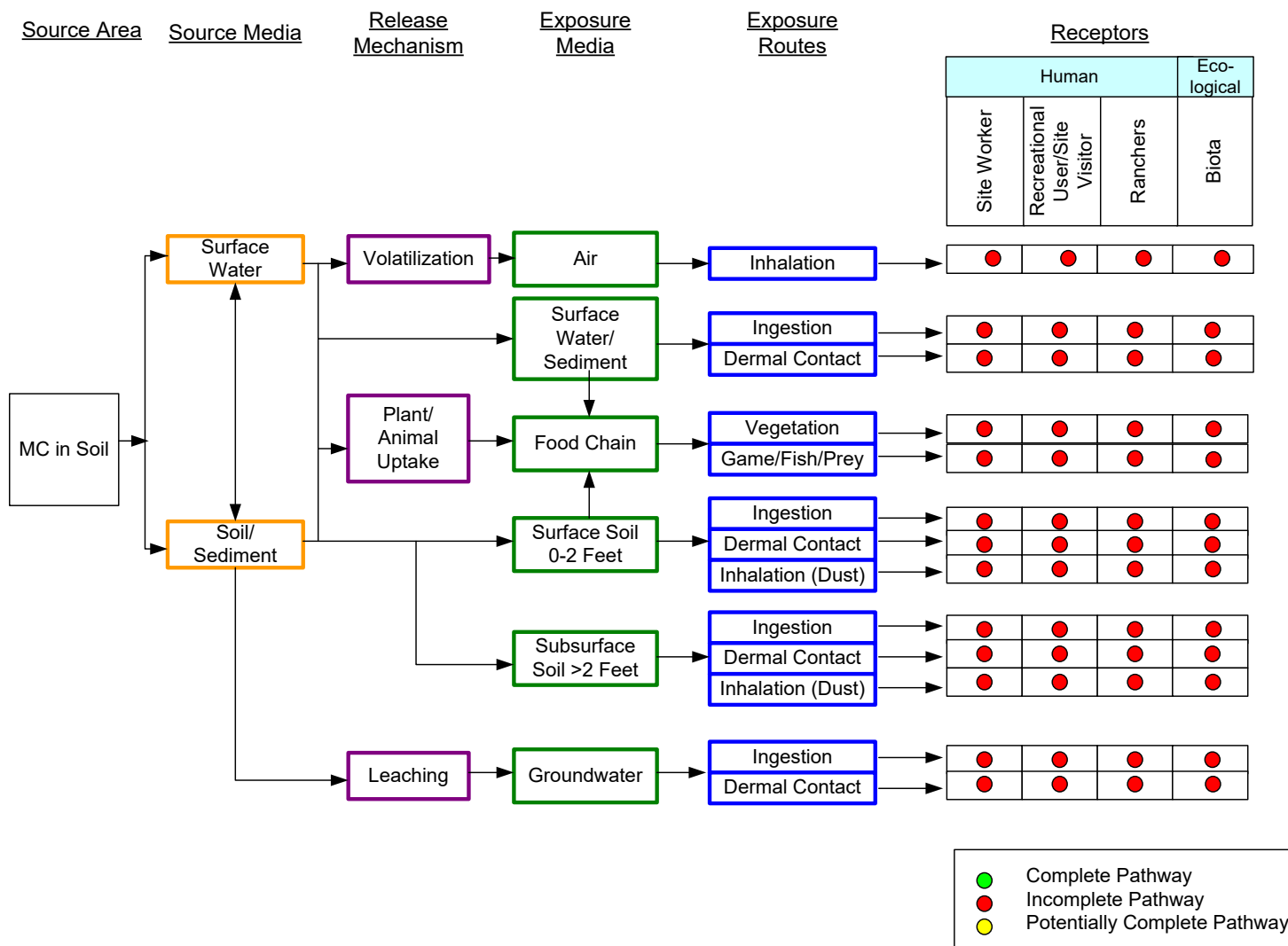


Figure 6-3: Incomplete Exposure Pathways for Receptors to MC at the Former Maneuver Area MR Site



Section 7

7.0 SUMMARY AND CONCLUSIONS

SI field activities were conducted for the Former Maneuver Area MR site associated with Fort Bliss, El Paso, TX from October 4 through October 8, 2010. Activities included visual surveys and surface soil composite and IS. The following conclusions resulted from the SI field activities at the Former Maneuver Area MR site.

All DQOs for this project as outlined in the *Final Site Inspection Work Plan, Fort Bliss, El Paso, Texas*, dated May 2010, were met.

7.1 FORMER MANEUVER AREA (FTBLS-002-R-01)

Based on the historical research conducted during the SI, items that may have been used at the Former Maneuver Area MR site include weapons such as the M1 (.30 caliber), M2 (.50 caliber), M16 (5.56 mm), M14 (7.62 mm), small arms blanks, and pyrotechnics of various unidentified types. According to historical documents, the Former Maneuver Area MR site was to be available for anti-aircraft artillery maneuvers and portions of the MRS were to be utilized as tactical maneuver areas for high-level bombing and strafing missions.

SI field activities conducted at the Former Maneuver Area included a visual survey of the site and the collection of four surface soil composite samples and 16 IS, including two QC samples. It was determined prior to the start of field activities that visual surveys would be conducted within 16 Investigative Areas within the site. Approximately 132.5 line miles of visual surveys were conducted at twelve of the sixteen areas (Areas 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, and 15). The field team was unable to access the remaining four areas (1, 3, 8a, and 12) due to road conditions or locked gates. The results of these activities are summarized below:

- No MEC was identified during the visual survey
- MD identified at the site in Areas 4, 5, 6, 9, 10, 11, and 14 included:
 - Fragments resulting from HE detonations
 - Fragments and fuzes from 4.2-inch mortar shells (Area 4 only)
 - .30-06 blank shell casings
 - 5.56 mm blank shell casings
 - 7.62 mm blank shell casings
 - .30 caliber blank shell casings
 - A fuze from an expended smoke grenade
 - '03 Springfield Stripper Clips
 - M104 illuminating flare canister lid
 - Machine gun links (.30-06, M60, .30 caliber)
 - Belt starter tabs
 - M14 Rifle Clip
 - M1 Garand Clips

- A live small arms round (.30-06 complete ball cartridge) was identified in Area 11
- Evidence of military activity including a military tent stake, chemical lights, communication wire, and a grounding rod for a generator was identified in Area 14 of the site
- No subsurface anomalies were identified
- Analytical results for metals indicated that all concentrations were below the applicable screening criteria
- No explosive compounds were detected in any of the samples

7.1.1 FUDS MMRP Eligibility

Based on the available historical records, it appears that the majority of the property associated with the Former Maneuver Area MR site was relinquished from use by the Army by 1980. The only exception is a tract of land (Block 79, Township 2, Sections 15, 16, and 21) that was under lease from the State of Texas from 1978 through 1987. Therefore, because the majority of the site was not under control or being used by the Army as of the October 1986, this area is eligible for the FUDS MMRP. However, the tract of land that was leased from the State until the end of 1987 is not eligible for the FUDS MMRP.

Section 8

8.0 RECOMMENDATIONS

The following are the recommendations for the Former Maneuver Area MR site associated with Fort Bliss, El Paso, TX. This information is summarized in Table 8-1 and depicted in Figure 8-1 at the end of this section.

8.1 FORMER MANEUVER AREA (FTBLS-002-R-01)

- **It is recommended that the Former Maneuver Area MR site become a Munitions Response Area (FTBLS-002-R) with two MRSs.**
 - This recommendation is based on the HRR, previous investigations completed at the Former Maneuver Area MR site, and the results of the SI field activities completed within the Former Maneuver Area MR site.
 - The first MRS, Former Maneuver Area A (FTBLS-002-R-01), is an approximately 24,459-acre site encompassing the area adjacent to the installation boundary.
 - The second MRS, Former Maneuver Area B (FTBLS-002-R-02), is an approximately 48,062-acre site that encompasses the remainder of the Former Maneuver Area MRA.
- Based on the identification of a mortar impact area, a firing position, and a fighting position, **the Former Maneuver Area A MR site is recommended for additional investigation for MEC.** Former Maneuver Area A also includes some areas that were unable to be surveyed and have a higher potential of being impacted by military training activities.
- Analytical results for metals indicate that all soil sample concentrations are below the applicable screening criteria and no explosives were detected in the samples collected in the area comprising the Former Maneuver Area A MR site. **Therefore, the Former Maneuver Area A MR site is recommended for NFA for MC.** However, should MEC be identified during the further investigation of the MRS, additional sampling may be warranted.
- Based on a review of the historical information, all property associated with the Former Maneuver Area A MR site was relinquished from use by the Army by 1980 and has been determined to be eligible for FUDS. **Therefore, it is recommended that further investigation of the Former Maneuver Area A MR site be conducted under the FUDS MMRP.**
- No evidence of MEC was identified during the visual survey conducted within the area comprising the Former Maneuver Area B MR site and only small arms debris was observed within this area. **Therefore, the Former Maneuver Area B MR site is recommended for NFA for MEC.**

- Analytical results for metals indicate that all soil sample concentrations are below the applicable screening criteria and no explosives were detected in the samples collected in the area comprising the Former Maneuver Area B MR site.

Therefore, the Former Maneuver Area B MR site is recommended for NFA for MC.

Table 8-1: Former Maneuver Area Site Inspection Recommendations

MR Area/Site	Range Inventory Acreage	HRR Acreage	SI Acreage	Recommendation	Basis for Recommendation (MEC)	Basis for Recommendation (MC)
Former Maneuver Area Munitions Response Area (MRA) (FTBLS-002-R)	73,538.6	72,520.82				
Former Maneuver Area A MR site (FTBLS-002-R-01)		Based on the review of the available land acquisition documents and more accurate GIS data, the acreage associated with the MR site was revised.	24,459.18	Former Maneuver Area A is recommended for additional investigation for MEC and recommended for NFA for MC. Based on the historical information that indicates the property associated with the Former Maneuver Area A MR site was relinquished by the Army by 1980, it is recommended that the site be further investigated under the FUDS MMRP.	MD was identified during the visual survey at the MR site. Evidence of military activities, including a mortar impact area, firing position, and fighting position, was identified.	Analytical results for metals indicate that all sample concentrations are below applicable screening criteria and no explosive compounds were detected.
Former Maneuver Area B MR site (FTLBS-002-R-02)			48,061.64	Former Maneuver Area B is recommended for NFA for MEC and MC.	No MEC was identified during the visual survey. Only small arms MD was observed at the site.	Analytical results for metals indicate that all sample concentrations are below applicable screening criteria and no explosive compounds were detected.

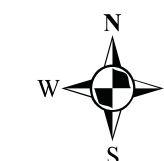
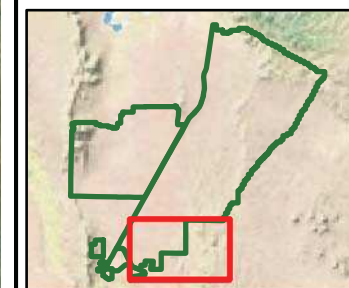


Site Inspection Fort Bliss, TX

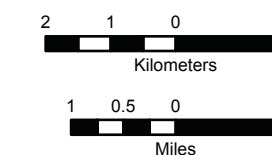


Figure 8-1

Former Maneuver Area MR Site Recommendations



- Current Installation Boundary
- City of El Paso
- Former Maneuver Area A MR Site
- Former Maneuver Area B MR Site (NFA)
- Investigative Areas
 - Surveyed
 - Not Surveyed



Aerial:
Source: Copyright:© 2009
ESRI, i-cubed,
GeoEye
Date: 2008
Edition: Final Report
Date: March 2011

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Section 9

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